

Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00
Canada	6.00
Foreign Countries (excepting daily editions).....	8.00
Single Copies.....	15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, \$1.00; foreign, \$2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 9,000 copies were printed; that of these 9,000 copies, 7,466 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,173 were mailed to advertisers, exchanges and correspondents, and 111 were provided for samples and office use; that the total copies printed this year to date were 281,700, an average of 9,390 copies a week.

VOLUME 57

JULY 24, 1914

NUMBER 4

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GENERAL NEWS SECTION.....

*Illustrated.

On Monday the United States Board of Mediation and Conciliation went to Chicago to offer its services in an effort to bring about a settlement of the controversy between the western railways and their engineers and firemen. The latter are threatening a strike unless they are granted demands for increases in pay and superimposed changes in working conditions which would cost the 98 roads involved some \$33,000,000 a year. The issues involved were fully presented in a statement issued on June 1, by A. W. Trenholm, chairman of the Conference Committee of Managers, which was published in the *Railway Age Gazette* of June 5, page 1240, and in an editorial in the same issue, page 1218. Since that time the brotherhoods have taken a strike

Western Engineers' Controversy

vote, the details of which they decline to give, and have issued to the newspapers a statement that they will not submit to arbitration. They even declined to join with the railways in a request for the services of the federal mediators, although they accepted mediation after the roads had requested it. It is perhaps natural that Messrs. Stone and Carter should consider it necessary to present a bigger bluff each time they present their audacious demands, and the advance refusal to arbitrate must be so classed, but it is inconceivable that they should be able to maintain such an attitude. A strike such as they propose, to tie up the western railways at the beginning of the crop-moving season at a time when the business of the country has completely transferred its hopes of prosperity from a Democratic administration to the forces of nature, would be lost from the start without the support of public opinion—and the newspapers have clearly indicated what kind of a reception would be accorded a refusal to arbitrate.

After a conference with the attorney general on Monday a committee of the directors of the New Haven announced that they could not carry out the dissolution plan previously agreed on because of the law passed by the Massachusetts legislature giving the commonwealth the right to buy for a reasonable compensation at some

President Wilson and the New Haven

time in the future the Boston & Maine stock which was to have been sold by the New Haven under the agreed on dissolution plan. President Wilson thereupon made public a letter calling on the attorney general to bring suit under the federal anti-trust law, together with the attorney general's letter to the President and to Mr. Hustis, of the New Haven. President Wilson in his letter, in speaking of the New Haven directors' decision, says: "Their failure upon so slight a pretext to carry out an agreement deliberately and solemnly entered into and which was manifestly in the common interest, is to me inexplicable and entirely without justification." The attorney general in his letter to Mr. Hustis points out that "it must be remembered that ever since 1909 the commonwealth has had the right to buy the New Haven holding company stock [Boston Railroad Holding Company] at a valuation to be fixed in substantially the same way as is now provided in respect to the Boston & Maine, and that therefore the New Haven's interest in the Boston & Maine is not subjected by the recent statute to any restrictions more burdensome than those imposed upon it when the New Haven was authorized to acquire it." While not in any way passing upon the wisdom or lack of it shown in the New Haven directors' decision, it is fair to point out that whereas the New Haven itself might have been willing to accept certain conditions in regard to what was until the Boston Railroad Holding Company law was passed an unlawful acquisition, it might well be that now no investor or banker could be found who would be willing to buy Boston & Maine stock with a string attached to it. The New Haven directors have no power of coercion over a possible purchaser such as the Massachusetts legislature had over the New Haven management in 1909.

The syndicate which had undertaken to underwrite the sale of \$30,000,000 new preferred 7 per cent. stock to Chicago, Rock Island & Pacific Railroad collateral 4 per cent. bondholders and Rock Island Company stockholders has decided to abandon the plan because the present rate of earnings of the company does not make a good showing on the proposed new preferred, and the surplus shown on the last balance sheet of the railway company that was made public is not a real surplus. The collateral bondholders' committee, of which James N. Wallace is chairman and of which the other members are James Brown, of Brown Brothers & Co., New York; Bernard M. Baruch, who is a member of the governing committee of the New York Stock Ex-

The Failure of the Rock Island Plan

change; Henry Evans, president of the Continental Insurance Company, and Frederick Strauss, of the firm of J. & W. Seligman & Co., New York, is asking the further deposit of bonds with the expectation of submitting a reorganization plan "based on the principle of giving the collateral trust bondholders the opportunity, or imposing on them the necessity, of themselves providing the money required." It will be recalled that the plan which has failed, commented on at some length in these columns in the issue of July 3, page 2, called on the collateral bondholders to sacrifice more than a third of their collateral—the Railway company stock—but did not compel them to submit to a cash assessment. The protective committee points out that during the year ending June 30, 1915, over \$9,250,000 and during the year ending June 30, 1916, over \$11,850,000 of capital obligations of the Railway company and its subsidiaries mature. There is furthermore an ominous suggestion in the last sentence of the committee's announcement:

Had it not been for the tentative plan arrived at in June this situation [a possible receivership of the Railway company] might have arisen on July 1. That it did not arise was due to the fact that through the effort of the committees, banking interests advanced money to the Railway company in view of the adoption of the tentative plan.

In other words, beside the capital obligations maturing in 1915 and 1916 shown on the last public balance sheet, there is an accumulating floating debt of the Railway company. The fact that James N. Wallace consents to act as chairman of the protective committee is a guarantee that everything possible will be done for the interests of the bondholders. Nevertheless in a situation such as this the revised balance sheet of the Railway company ought to be made immediately available to holders of the collateral trust 4's.

The House Committee on Interstate and Foreign Commerce on July 14 ordered reported to the House a bill to eliminate boiler-

Eliminating Boiler-makers as Locomotive Inspectors

makers as locomotive inspectors for the Interstate Commerce Commission under the boiler inspection act. The bill was introduced in the House on May 12, by Representative Goeke of Ohio, and in the Senate on April 17, by Senator Cummins of Iowa, but its real sponsors are the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen. The bill, H. R. 17,894, is an amendment to the present locomotive boiler inspection act, and extends the provisions of that act to apply to and include the entire locomotive and tender and all parts and appurtenances thereof, whereas now it applies only to boilers and their appurtenances. Its real purpose is revealed by its final clause: "That upon the passage of this act all inspectors and applicants for the position of inspector shall be examined touching their qualifications and fitness with respect to the additional duties imposed by this act." There already has been considerable rivalry between the members of the boilermakers' and the other unions for positions in the boiler inspection service, with the result that of 49 inspectors only 14 have had experience in boiler work only, while 16 are former engineers and firemen, without any knowledge of boilermaking. The proposed amendment seems well designed to get rid entirely of those who have no general knowledge of locomotives except such as pertains to boilermaking, and to keep them out of the service. What the boilermakers will have to say to this remains to be seen. Several of the mechanical officers of the railways were given a hearing before the House committee on July 1 and pointed out the lack of need for the bill and the lack of flexibility there would be in its operation. While locomotive boiler inspection undoubtedly has had some good results in requiring the railways to maintain their power in better condition, it is one thing to make rules for boilers and their appurtenances, and quite another thing to deal with all of the hundreds of parts of the complicated locomotive machinery about which there may be as many differences of opinion as there are parts.

The bill would require the making by the Interstate Commerce Commission and its inspectors of rigid rules governing the construction and maintenance of all parts of the locomotive, to be enforced by inspectors, most of whom are sure to be incompetent for such important duties.

RAILROAD LABOR LEGISLATION IN MASSACHUSETTS

MASSACHUSETTS legislatures used to be looked upon as possessing a good deal more sanity and conservatism than the average American "deliberative" body, but that favorable view can be no longer entertained. Within the last year or two the labor union demagog has ruled in the Bay State about as recklessly as elsewhere. Two laws have just been passed which may be cited as examples. One is to the effect that Massachusetts station employees (not the agent himself) shall not be employed over 9 hours in any 10 hours; and the other that every person employed in signal towers or at interlocking switching machines or in telegraphing or telephoning train orders shall be allowed two days off each month "with regular compensation." Both of these laws have in them elements of fairness; but both bear the earmarks of the labor union specialist who sees to it that the employees themselves shall not be punished for violations of the laws of health. Men who prefer to work without suitable rest so as to get more money, are never touched by labor union law. In a large majority of station jobs 10 hours, or even 12 hours, is not an unhealthful or unsafe period, for the reason that the men can get rest and time to eat while on duty. It is only a question of the reasonableness of the compensation.

Having failed to get what he wants in money—wages rates—the labor specialist gets the weak-kneed legislators to give him an hour's time. This is the best way to annoy the railroad company for it will cost more to supply a relief man for the hour's "lay off" than it would to pay the regular man a proportionate extra sum. In the monthly two-days' deduction scheme, also, the immediate question is a matter of pay—and not religion or social morality. This bill is so illogical that the governor refused to sign it, and it went into effect because of his five days' silence. The very terms of the statute—"with regular compensation"—reveal its purpose. These tower men all work under the Federal law and have easy hours. It would be difficult to prove that eight hours a day is unhealthful, except possibly in a few hard worked positions. Presumably these men have fair rates of pay. If they work two days less they ought to receive pay for two days less. The terms of the act do not forbid the employer to reduce the rate per day; but the promoters of the law can be trusted to see that this is not done. They know how railroad managers always yield, in small matters, to keep the peace. Laws based on alleged considerations of health afford legislators their easiest opportunities to make fools of themselves. When the United States Steel Corporation relieved a lot of men of Sunday work, thousands of them left and went to work for other mills seven days in the week. Others are said to work six days for the big corporations and also on Sunday for some other employer. Making men either healthy or moral, by statute, is a very difficult matter. It is to be hoped that the process will succeed better with the Massachusetts railroad men than with the Pennsylvania steel workers.

GOVERNMENTAL DISREGARD OF THE EXPERT

THE attitude of Chairman Mohn of the House Committee on Postoffice and Post Roads, and also of the Postoffice department, toward the report of the Joint Congressional Committee, which was created to investigate the question of the way in which the railways should be compensated for carrying the mails, well illustrates the attitude usually assumed toward expert bodies by politicians and bureaucrats in this country. In Germany, where the administration of public business is a success, it is usually necessary for a man to be an expert before he can

become a high officer in the bureaucracy, and governmental action is habitually taken either on the advice of experts or by officials who are experts. In this country the fact that a man is a recognized expert on any subject is sufficient to make the typical politician or bureaucrat regard him with suspicion and accept with reluctance, or entirely reject his views.

The attitude assumed by the American politician or bureaucrat toward a body of experts which has been created by Congress is similar to his attitude toward any other expert or expert body, if, perchance, the conclusions reached do not harmonize with his preconceived notions or tend to further his political aspirations. The Joint Congressional Committee, of which former Senator Jonathan Bourne, Jr., the author of the parcels post law, is chairman, spent a long time investigating railway mail pay. It found the existing methods of payment crude, antiquated and unscientific, and the amount paid unjustly low. It decided to recommend to Congress legislation providing for a complete change in the basis of compensation. Before the report could be sent to Congress the chairman of the House Committee on Postoffices and Post Roads and the bureaucrats in the Postoffice department, hurriedly collaborated in preparing and introducing a bill which would reduce the compensation of the railways and which Senator Bourne denounces as unjust to them and designed to give the Postoffice department an autocratic power which would be contrary to the spirit of American institutions.

The developments regarding legislation for the regulation of the issuance of railway securities have been similar. During the Taft administration Congress created a commission to investigate this subject. It did investigate it thoroughly and made a very able report. The report specifically recommended legislation of a certain nature and having certain definite purposes. At this session of Congress a bill for the regulation of securities has been introduced which utterly disregards the report and recommendations of the Hadley Commission.

President Wilson recently nominated Messrs. Jones of Chicago, and Warburg of New York for members of the Federal Reserve Board. He selected them because of his belief in their expert fitness. Their confirmation is being vigorously opposed in the Senate by members of that body who put political buncombe above efficient administration.

The United States is the worst governed civilized country on earth. Its city, state and national legislatures and administrations are wasteful, inefficient and often corrupt. The chief cause of the waste and inefficiency is the habitual ignoring of the expert by the politician and the bureaucrat. One of the fundamental duties of government is to provide and maintain good roads and streets. While good highways are the rule in Europe, they are altogether exceptional in the United States. The main and primary function of government is to prevent and punish crimes of violence. In no other civilized country are crimes of violence so prevalent as here or their punishment so rare.

We are rapidly extending the interference and control of the government in business affairs. Many are advocating not merely government regulation but government ownership. It is manifest to every reading and thinking man that regulation will be a failure and a calamity if it is not done by experts. And government management would be a still worse failure and a still greater calamity if not carried on by experts. But while there is a great public movement to reform, regulate or acquire business concerns that are efficiently managed, there is no movement to reform and improve the worst managed of all our concerns, namely, the governments which are doing the regulating of business, and which many people want to do the managing. Could anything be more abysmally stupid?

AUTOMATIC TRAIN STOPS—III

WE have said that those who advocate the use of automatic train stops and those who do not—who declare the use of such devices unnecessary, or inexpedient, or impossible—ought to get together and thrash out their differences. This presupposes that on both sides there are interests of importance

and respectability. A superficial observer might be disposed to deny this. The radical advocate of automatic stops—who, for convenience, we may call a "progressive"—declares that the railways are so slow and unenterprising, not to say neglectful, that they are scarcely to be classed as respectable; the government should brush aside their excuses, stop their dilatory conduct, and by congressional enactment tell them what to do. Big manufacturers, acting truly in the interest of the public, make extensive experiments on their own initiative; the railroads do not do this (at least not in the direction that Congress wants them to) and so they should be coerced.

On the other hand, many railroad men look upon the "progressives" as a lot of unpractical theorists, with whom serious railroad managers, responsible to the public and to stockholders, can ill afford to spend valuable time.

Both of these views should be laid aside, though each may have in it an element of truth. The railroads cannot stand too coldly on their dignity, for now and then they kill passengers, and the public's insistent questions must be answered. The progressive cannot be kicked out of doors, for occasionally he finds a capitalist, supposedly of sober judgment, to espouse his cause; while numerous congressmen take a more or less intelligent interest in his ideas. Many thousands of dollars have been put into automatic stop experiments, and the press can be depended on to help popularize every scheme that has even a small measure of merit. The public in general has ample reason for demanding a full discussion.

It is true that a full and fair discussion probably would not prove an easy thing to bring about. To show the perfection of our present safeguards, even those on the best roads, so that Congress and state railroad commissioners will understand the matter, will be a slow process. Mr. Elliott, of the New York Central, and other signal engineers have appeared before the House Committee at Washington and have laid before the committee numerous important facts; but, as in other similar hearings, there was hardly a beginning toward a thoroughly good understanding. Mr. Elliott for the railroads, and Congressman Esch for the public, would have to spend a good deal of time on the subject to get fully acquainted with each other's respective points of view, to say nothing of enlightening the public. That the general use of automatic stops would introduce new dangers and that at best the protection given would be very costly, can be shown to the lay mind only by a tedious course of instruction.

The railroads, as a body, cannot be said as yet to have formulated the case, even for themselves, in any satisfactory way. This ought to be done even if it be a work requiring some time and money. That A. R. A. report will have to be amplified very greatly before any impression will be made on the public generally. The public says, in effect, that railroad travel can be made safer, and proposes a way to do it. It is the duty of the railroads, if they respect their master, the public, to enlighten that public.

How can the public form a correct idea of the railroads' position? It cannot intelligently differentiate between the Chicago & Eastern Illinois, with ninety engines equipped with the Miller apparatus, and the Pennsylvania, which says, in effect, that an investment like that on the Chicago & Eastern Illinois is wasteful. Electric roads, those out-of-doors as well as those in tunnels, use the stops regularly and are reported as finding their use satisfactory. The reason why the Pennsylvania uses automatic stops in and near New York City and not elsewhere is not well understood; it ought to be made clear.

Experiments with automatic stops, more or less desultory, were begun over twenty years ago—in 1893. For five years, now, experiments more or less sincere have been going on in a number of places. Should the public be expected to reject these schemes as worthless unless and until some recognized authority declares them worthless?

We forget the simple maxim, "in time of peace prepare for war." Unless there shall be an unheard of freedom from disastrous collisions, this question will come up again, in an acute

form. When it does come up the same issues that have been discussed on former occasions will be discussed again. Railroad officers, recalling their experiences before congressional committees, and elsewhere, in the past—as, for instance, in the matter of freight car safety, and boiler inspection—must conclude that the railroads, both in their own interest and in the public interest, should present constructive proposals rather than mere obstructive arguments.

The American Railway Association committee thus far has simply set forth the highest possible ideal, which demands so much that most readers interpret the report as a negative declaration—a statement of what cannot be done. This is looked upon by many as only one move in a policy of delay, which leaves the way open for any and all parties or interests, reliable or not reliable, to exploit whatever schemes they choose—as, for instance, the bill introduced in Congress a year or two ago by Mr. Mann, of Illinois, designed to make the use of a certain type of automatic stop compulsory everywhere!

A committee cannot present constructive proposals in any satisfactory way except on the basis of actual experiments; but if it is wise for the railroads unitedly to go before Congress or the public with definite proposals, this duty of making experiments must be faced. Surely there is not much hope of presenting a united front, with any chance of convincing objectors, so long as it is left to individual roads to follow each its own ideas. The New Haven road's ten-thousand-dollar offer does not seem to have resulted in much progress, as yet. If extended experiments are desirable, the railroad interest as a whole should consider the question of carrying them out. If any road were unwilling to bear a fair share of the cost of such experiments, it would have to consider the possibility that Congress may compel all roads to bear an unfair share—that is, require them to make unwise experiments. To congressmen this matter appeals as a small detail, and they will take no great pains to adjust financial burdens with extreme nicety.

In speaking of experiments we mean, of course, not one of those short-lived installations designed to dazzle investors or congressmen, of which we have had far too many, but a course of experiments which shall bring out the full truth. As is well known to every railroad officer who has studied the subject, the real need is not for a device to stop a train—we have a dozen of those already—but a reliable *system*, which includes not only machines and their operation, but men and administration and innumerable operating details. The New Haven road's \$10,000 offer, by its terms, can at best only get to the starting point of the essential study.

And not only are the railroads better fitted than the government to do whatever testing is necessary—they only are competent to do it. An experiment extending over two years' time and perhaps a hundred miles of territory, can be fully successful only under the direction of a manager who is clothed with very full powers and who can have at all times a sympathetic official atmosphere.

It is to be remembered, finally, that the real issue is not the accomplishment of perfection, but the accomplishment of a decided improvement. As we understand it, the conclusion reached by the officers of the Interborough as to the lesson of their ten years' experience is that duty to the public requires the adoption of the best available arrangement; that to defer action in the hope of getting something better would be a mistake. The action of the French government must be taken to indicate the same lesson; that with very dense traffic the best available is well worth having. If automatic stops are not desirable, and if the next best thing is a cab signal or an audible roadside signal, Congress will quickly turn its attention in that other direction. The railroads should forestall Congress.

Always it must be remembered that there are two problems: One is that of safety and the other that of economy. By the use of "speed control" to do away with some of the objections to automatic stops, or by the adoption of cab signals or audible roadside signals, the question of safety may be put on the road to

settlement; but having settled that, the question of cost will still remain. We do not minimize this feature. But suppose this item—safety from collision—should prove as costly as that of the steel passenger car: Can it be evaded? And, as in the case of the steel car, it may be that it is not desirable to evade it. However this may be, the first question should be settled first.

There is an element of sober truth in the well-known observation of a certain railroad president that it would be possible to preserve passengers' lives at too great a cost per passenger. But the question of the ultimate cost is a vital one. The public, if we may judge by its attitude in the matter of freight rates and other things, will not accept an unfavorable answer concerning the question of cost until the whole subject has been clarified by further demonstrations in the mechanical field.

NEW BOOKS

Proceedings of the American Railway Engineering Association. Size, 6 in. by 9 in., 1,563 pages, illustrated, bound in half morocco, cloth or paper. Published by the American Railway Engineering Association, Karpen Building, Chicago. Price, half morocco, \$7; cloth, \$6.50; paper, \$6.

Following the practice established two years ago, this volume is printed on India paper, enabling the 1,563 pages to be printed in one volume. It contains the complete proceedings of the fifteenth annual convention held in Chicago, March 17-19, 1914, with 21 committee reports and discussions, and eleven monographs which have been published previously in the bulletins of the association during the past year. Following the practice of last year, all the reports have been presented together, followed by the discussions on the various reports grouped together, with the monographs last. The work of this association is so commonly recognized as representing the best accepted practice in the country that detailed comment is unnecessary. This volume is printed in the same high class manner characterizing the Proceedings of earlier years. The Proceedings of this association are coming more and more to be recognized as necessary for frequent reference by all railway officers concerned directly with the maintenance of track and structures.

Engineering Geology. By Heinrich Ries, professor of economic geology, Cornell University, and Thomas L. Watson, professor of economic geology, University of Virginia. Size 6 in. by 9 in., 672 pages, 400 illustrations, cloth binding. Published by John Wiley & Sons, Inc., New York City. Price \$4.

The authors of "Engineering Geology" have given students in civil engineering in their respective universities, special courses in geology as applied to engineering for some years, and in the belief that there is a need for a similar course in other technical schools they have undertaken to prepare a suitable text book.

The authors believe that many civil engineering courses are deficient in the attention given to geology and their belief will no doubt be shared by many engineers who in their early practice encountered problems in tunneling, dam or reservoir construction, the handling of land slides, the securing of a proper water supply, the disposal of sewage or the purification of water, etc. The authors have attempted to illustrate all geological principles by actual cases in engineering work, as it is felt that this method appeals more strongly to practical engineers as well as students and is more successful from the pedagogic standpoint.

The following chapter headings indicate the scope of the work: the rock forming minerals; rocks, their general character, mode of appearance and origin; structural features and metamorphism of rock; rock weathering and soil; surface water; underground water; land slides and their effect; wave action and shore currents, their relation to coasts and harbors; lakes, their origin and relation to engineering work; glacial deposits, their origin, structure and economic bearing; building stone; limes, cement and plaster; clay and clay products; coal series; petroleum, natural gas and other hydrocarbons; road foundations and road materials; and ore deposits. Two appendices are included, the first giving a geologic column, and the second treating of geological surveys.

The Division of Freight and Passenger Expenses

New and Old Formulas Contrasted and the Newest Formula Applied to the 1914 Classification of Expenses

The Interstate Commerce Commission in its tentative form of annual report for the fiscal year beginning July 1, 1914, has included blank columns which at the option of the railroad company may be used to show a division between expenses incurred in passenger service and expenses incurred in freight service. The Pennsylvania Railroad was the first important American railroad company to divide its expenses as between freight and passenger service, and its formula for this division has been revised from time to time. The latest and most comprehensive attempt to divide freight and passenger expenses has been made by the roads running through Oklahoma. The accounting officers of these roads have worked in conjunction with the Oklahoma Commission to draw up an experimental set of formula for dividing all expenses as between states, as between state and interstate, as between line and terminal, and as between freight and passenger service. The divisions as between states and as between line and terminal were described in these columns in the issue of July 3.

The Oklahoma scheme is far more comprehensive and less arbitrary than the Pennsylvania's, but, on the other hand, of course, is purely an experiment, while the Pennsylvania's has been used in practice for a great number of years and has been found to be valuable for comparative purposes.

Maintenance of way presents the most difficulties of any of the general classes of expenses, since so many of the primary accounts under this heading must necessarily be divided on some more or less arbitrary basis. Both the Pennsylvania scheme and the Oklahoma scheme are based on the old system of Interstate Commerce Commission accounts, which was discontinued July 1, 1914, but it is possible to apply the same principles to the new system of accounts which went into effect at the beginning of this fiscal year.

The Pennsylvania divides all of the maintenance of way and structure primary accounts as between freight and passenger service on a revenue train mileage basis with the exception of electric power transmission and docks and wharves. There would, therefore, be no change, presumably, in the Pennsylvania's system with the new classification. The Oklahoma scheme does not attempt to divide freight and passenger expenses until expenses have been divided as between line and terminal (see July 3 issue of the *Railway Age Gazette*).

The theory which underlies the Oklahoma division of maintenance of way and structure expenses is that a considerable proportion of these expenses may be divided directly, and fairly accurately, through careful observation of the facts. Thus the expenses of superintendence for both line and terminal maintenance of way accounts are to be divided directly wherever possible, and this presumably means that an actual study of the time spent by officers whose salaries are charged to superintendence shall be made with the expectation of being able to assign at least a part of their salaries, office expenses, etc., directly to one service or the other. The remainder of the superintendence expenses, that is, the expenses common to both services, are, under the Oklahoma scheme, to be divided in the same proportion as are the expenses for line and for terminal, respectively of ballast, ties, rails, other track material, roadway and track, removal of snow, sand and ice, tunnels, bridges, trestles and culverts, over and under grade crossings, grade crossings, fences, cattle guards and signs, snow and sand fences and snow sheds, signals and interlocking plants, telegraph and telephone lines, electric power transmission, buildings, fixtures and grounds, and docks and wharves.

In the first draft of the Oklahoma scheme the line expenses of the first nine of these accounts were to be divided experiment-

ally on four different bases. (1) On a revenue train mileage basis; (2) on a train speed ton mile basis; this is the gross ton miles of revenue freight and passenger trains, including the weight of the locomotive and cars as well as loading, multiplied by the average speed between stations for such trains. (3) On an engine ton mileage basis the weight of the engine including the tender with coal and water; and (4) on the basis of the assigned line expenses—that is, the directly assignable expenses of the cost of the repairs of steam locomotives; cost of repairs of passenger train cars; cost of repairs of freight train cars; road enginemen's wages; road engine house expenses; fuel for road locomotives; water for road locomotives; lubricants for road locomotives, and other supplies for road locomotives; road trainmen and train supplies and expenses, and clearing wrecks.

The line expenses under these twelve accounts are divided as follows: The repairs of steam locomotives on a mileage run basis with the switching mileage subdivided according to time spent in each class of service. Passenger and freight train car repairs are, of course, assigned to passenger and freight service respectively, as are also the wages of road enginemen, engine house expenses and fuel, water, lubricants and other supplies for road locomotives, the engine house expenses being apportioned on the basis of locomotives handled, and locomotives in mixed service being apportioned on the basis of freight and passenger car ton miles in mixed trains, the fuel, etc., involving common expenses being apportioned on the basis of fuel issued to the locomotives involved, with the mixed engine mileage divided on the basis of respective freight and passenger car ton miles; road trainmen and train supplies being apportioned the same as road enginemen, and clearing wrecks being apportioned to the service in which the wreck takes place; common expenses, such as a wreck involving both freight and passenger trains being apportioned on the basis of the charges for clearing wrecks, assignable exclusively to each one of the two services.

The Oklahoma scheme calls this fourth method of dividing the roadway and track (labor and materials) expenses, the Cost Accounting Method. From one point of view this is true since upkeep of roadway is not an object in itself, but simply a means to the desired end of producing transportation and is, therefore, incidental to the cost of producing transportation and as an incidental expense it may properly be divided upon the proportion of determinable expenses. Moreover, the inclusion of maintenance of equipment expenses which vary in part with the weight of equipment and certain expenses which are divided on a car ton mileage basis, as well as the expenses of clearing wrecks, is a highly ingenious attempt to weight the average used in the arbitrary division of maintenance of way expenses.

The second method goes into less theoretical refinement, and for this reason may not be so strictly in accordance with cost accounting principles, but it appears to be more practically useful. In this method speed and weight of trains are given a relationship, arbitrary, of course, but one in which practice alone can show glaring defects. Rails, ballast and other track material do wear out directly both with the tonnage passing over them and the speed of the trains. Ties, of course, rot on most roads from weather conditions rather than because of pounding either from weight or speed of trains, but the standard of ties and the frequency with which they are renewed does depend quite directly both on weight of trains and on the speed of trains. No instructions are given for estimating the weight of passengers, but this is not a difficult thing to do with a fair degree of accuracy, and

when passenger equipment, is once weighed, it is not difficult to keep a record of the weight of trains.

The objection to the second method comes when we consider removal of snow, maintenance of tunnels, and over and under grade crossings. It is fanciful to say that these expenses vary with speed and weight of trains. It would seem that these accounts ought to be divided according to the fourth method.

The final revised Oklahoma scheme uses no one of these four methods and divides the above accounts for common tracks as between freight and passenger on the basis of engine ton miles based on weight of engines in working order. Presumably it was felt that keeping a record of total weights of passenger trains was hardly worth the expense involved and presumably the same consideration led to the elimination of speed as one of the factors. Since, however, this factor of speed varies so widely and, moreover, is of so much importance in determining the standard of maintenance, it seems a pity that for experimental purposes at least the engine ton mile was not multiplied by average speed between terminals.

Terminal expenses of the nine primary accounts are, of course, in many cases on a directly assignable basis. Common tracks, such as shop, store house and repair tracks, are apportioned on the basis of the assigned charges of terminal expenses, of repairs of steam locomotives, repairs of passenger train cars and repairs of freight train cars. Common expenses, such as engine house, turntable, wye, fuel and water tracks, are apportioned on the basis of the assigned charges for engine house expenses.

The maintenance of grade crossings, fences, cattle guards and signs, and snow and sand fences, and snow sheds for line facilities, are apportioned on the basis of revenue train miles as between freight and passenger service, the terminal facilities upkeep charges of grade crossings, etc., being charged to freight, and the snow and sand fences not being charged to terminal at all.

The maintenance of signals and interlocking plants being entirely a line charge, are apportioned between passenger and freight service—for the interlockers on the basis of respective number of freight and passenger trains passing over them, and for signals on the basis of respective train miles.

The maintenance cost of telegraph and telephone lines used in line service are allocated direct to passenger or freight where possible and the common expenses on the basis of revenue train miles, while the maintenance charges of these facilities used in terminal service are apportioned on the basis of the charges for station employees, which charges are assigned on the basis of a time study of each employee.

The maintenance of electric power transmission can, of course, be allocated direct to one class of service or the other for both line expense and terminal expense on the basis of power used.

The maintenance of buildings, fixtures and grounds used in both line and terminal service are allocated direct to freight or passenger, according to use and facilities that are used in common by both services, such as common depot and station buildings on the basis of the estimated portion of repairs incurred by each class of service, considering each building on its merits. Engine house repairs are divided in proportion to the charges made to each service for engine house expenses, both yard and road. Shops on the basis of assigned locomotive and car repairs, fuel and water stations, proportionate to the charges for fuel and water transportation expenses—yard and road; and section and tool houses on the basis of the division of roadway and track expenses.

Maintenance of docks and wharves both line and terminal are allocated direct where possible and common expenses on a basis of use. Roadway tools and supplies (line) are allocated on a basis of revenue train mileage and terminal are all charged to freight.

Injuries to persons, stationery and printing and other expenses both line and terminal are allocated direct to freight or passenger where possible, and common expenses on the basis of previously

mentioned maintenance of way and structure accounts, excepting superintendence and roadway tools and supplies. Maintenance of joint tracks, yards and other facilities (line) are apportioned direct where possible, and common expenses on a basis of revenue train miles of each district, and common terminal expenses on a basis of the cars of each class of service handled at the terminals.

MAINTENANCE OF EQUIPMENT

Maintenance of equipment with certain exceptions lends itself comparatively easily to accurate division as between freight and passenger service. The Pennsylvania divides its expenses as follows: Superintendence on the basis of the other maintenance of equipment items, steam locomotive repairs, renewals and depreciation on a revenue train mileage basis; and repairs, renewals and depreciation of electric locomotives, passenger train cars, freight train cars, electric equipment of cars and floating equipment according to the facts; power plant equipment also according to the facts. The repairs, renewals and depreciation of work, equipment and insurance are divided on the basis of revenue train mileage, while shop machinery and tools, injuries to persons, stationery and printing, and maintaining joint equipment at terminals, are divided on the basis of other maintenance of equipment accounts.

The Oklahoma scheme is almost as simple, but expenses that are not directly assignable are divided on what appears to be a more scientific basis. Superintendence, both line and terminal, is apportioned on the basis of assigned charges for respective locomotive, passenger car, freight car, and work equipment repairs. Both line and terminal expenses of repairs of steam locomotives are divided as between freight and passenger, switch and work on a basis of miles run by individual locomotives in each service, and the switch mileage is further subdivided on the basis of the time spent in freight and passenger switching, and the work on the proportion of the basis of assigned charges of maintenance of way and structure expenses, excepting superintendence and roadway tools and supplies, injuries to persons, stationery and printing, and maintaining joint tracks. Renewals and depreciation are divided on the same basis as repairs, as are also the repairs, renewals and depreciation of electric locomotives. The repairs, renewals and depreciation of passenger train cars are, of course, assigned to passenger service, and freight cars to freight service, and all electric equipment of cars on the basis of freight and passenger cars, all floating equipment according to the service in which used, and all work equipment on the basis of the maintenance of way charges mentioned above. Shop machinery and tools are apportioned on the basis of assigned charges for the respective locomotive, passenger car, freight car and work equipment repairs, as are also injuries to persons, stationery and printing and other expenses, power plant equipment being apportioned on a basis of power used.

Maintaining joint equipment at terminals being entirely a terminal charge is divided as between passenger and freight direct where possible and common expenses on the basis of respective cars handled at terminals.

TRAFFIC EXPENSES

There is an interesting difference in the Pennsylvania and Oklahoma methods of dividing traffic expenses. The Pennsylvania assumes that all of these expenses can be accurately divided according to the facts, even to superintendence, which, under each of the other general classes of expenses, is divided in the Pennsylvania scheme on an arbitrary basis.

The Oklahoma scheme considers all traffic expenses as terminal, but does not assume that all of them can be divided accurately as between freight and passenger and of the common expenses apportions 50 per cent. each to freight and passenger. The reason that the Pennsylvania's traffic expenses can all be divided is because the Pennsylvania has a distinct organization of freight and passenger traffic men, all the way up to the vice-president, who, however, is in charge of the entire traffic department.

TRANSPORTATION EXPENSES

The primary transportation accounts which the Pennsylvania apportions between freight and passenger on a basis of "facts" are station employees, weighing and car service associations, coal and ore docks, motormen, enginemen (when in mixed passenger and freight service, their wages are divided between these accounts on the basis of mileage of cars in mixed trains); fuel for road locomotives (for mixed trains divided on car mileage basis); operating power, purchased power, road trainmen, train supplies and expenses (pay of employees and material used in connection with mixed passenger and freight trains apportioned between these accounts on relative work performed or use made of material); operating floating equipment, express, loss and damage to freight and baggage. The primary accounts that are apportioned on revenue train mileage are superintendence, despatching trains, station supplies and expenses, yardmasters, yard conductors, yard switch and signal tenders, yard supplies, crossing flagman, drawbridge operation, clearing wrecks, telegraph and telephone operation, stationery and printing, insurance, damage to property, damage to stock, injuries to persons, operating joint yards and terminals.

Yard enginemen, engine house expenses (yard), fuel for yard locomotives, water and lubricants for yard locomotives and other supplies, are divided on a yard locomotive mileage basis and operation of fuel stations, water for road locomotives, lubricants and other supplies, are divided on a road locomotive mileage basis.

The Oklahoma scheme divides superintendence, both line and terminal, by directly assigning expenses where possible and apportioning common expenses on the basis of assigned charges of all other transportation expenses, except telegraph and telephone operation and express service, stationery and printing, other expenses, loss and damage to property and stock, injuries to persons, and joint tracks and facilities. Despatching trains is apportioned for line service—there being no terminal service—on the sum of total train mileage of freight and passenger trains in the same territorial units as are used for dividing these expenses between the different states.

Station employees are the subject of time studies and their wages are divided in proportion to the duties performed by them in each class of service.

Weighing and car service associations, and coal and ore docks expenses are assigned to freight exclusively. Station supplies and expenses are allocated direct where possible and common expenses are apportioned on the basis of the assigned charges for station employees.

All yard expenses are to be divided on a time basis, the expenses of each yard to be treated separately and all passenger switching to be considered line service.

Motormen, road enginemen, fuel and water for road locomotives, and lubricants and other supplies for road locomotives, road trainmen, train supplies and expenses are all allocated direct with mixed service apportioned on the basis of freight and passenger car ton miles in mixed trains. Engine house expenses are apportioned on the basis of the number of locomotives handled, locomotives in mixed service being apportioned on the basis of freight and passenger car ton miles in mixed trains.

Operating power plants and purchased power are apportioned as between freight and passenger on a basis of mileage of equipment used employing such power, while interlockers and block signal operation, crossing flagmen and gatemen, and drawbridge operation which are line services are apportioned on the basis of freight and passenger trains passing such facilities. Crossing flagmen and gatemen and drawbridge operation, which are terminal service, however, are apportioned on a basis of assigned charges of yard operation.

Clearing wrecks is charged to the service in which the wreck occurs and common expenses apportioned on the basis of located charges. Telegraph and telephone operation is apportioned on the basis of all maintenance of way, maintenance of equipment,

traffic and transportation expenses. The cost of operation of floating equipment is, of course, assigned according to the service performed. Stationery and printing and other expenses are assigned directly where possible and apportioned where common on the same basis as superintendence. Loss and damage to freight is, of course, assigned to freight service and baggage to passenger service, and damage to property, to stock on right of way, and injuries to persons directly where possible, and common expenses are apportioned on the basis of directly assignable charges of this account. Operating joint tracks and facilities are assigned directly where possible and common expenses are apportioned on the revenue train mileage by divisions in each service.

GENERAL EXPENSES

The Pennsylvania divides all general expenses on a revenue train mileage basis.

The Oklahoma scheme assigns salaries of general officers, their clerks, expenses and general office supplies, directly where possible, apportions the remainder on the basis of the assigned charges on all expenses other than general expenses. Law expenses are allocated in the same way, while insurance, directly where possible, is apportioned when common on the basis of "appropriate units of property or persons insured." Relief department expenses, pensions, stationery and printing, and other expenses are apportioned on the basis of assigned charges to all expenses except general expenses.

General administration of joint tracks, yards and terminals, where common, is apportioned on the basis of assigned charges on all other joint facility accounts. Valuation expenses are apportioned on the basis of all assigned charges except general expenses.

THE NEW CLASSIFICATION

Both the Pennsylvania and Oklahoma methods of dividing expenses use the old form of primary accounts, but it is possible to apply the theory apparently underlying the Oklahoma scheme to the classification which went into effect July 1, 1914. The following table is an attempt to carry out the Oklahoma theories for the new classification. It is understood that the division of expenses as shown in this table is in all cases direct where possible, and the column headed direct, contains the accounts which may be charged in whole to one service or the other. The other columns give instructions for dividing common expenses of such accounts as are not assignable in their entirety direct to one or the other service. Thus the expense of superintendence under maintenance of way and structures is to be allocated directly where possible to freight and passenger service, and it is only the balance which is not directly allocatable that is to be divided on the same basis as the assigned charges in accounts 202 to 220, excluding 204 and 205, and adding 272. In the same way a part of the charge for roadway maintenance may represent the cost of roadway maintenance of tracks used exclusively in freight service, and another part the cost of roadway maintenance of tracks used exclusively in passenger service. These directly assignable charges are to be made to the proper service and it is only the remainder which is to be allocated on a basis of engine ton miles.

The table will be clearer by following through a hypothetical example. The accompanying table shows an expense account for a road of 800 miles. Superintendence under maintenance of way on this road cost \$70,000, and no part of this sum could be assigned directly to either freight or passenger service. According, therefore, to the Oklahoma scheme this \$70,000 is to be divided between freight and passenger service on the same basis as the charges to accounts 202 to 220, excluding 204 and 205, and adding 272. It will be seen that these accounts are to be divided direct where possible, and where this is not possible, on an engine ton mile basis. According to our table, the total of these accounts that are common to both passenger and freight amounts to \$1,186,500, and there is \$24,600 directly assignable to freight and \$3,400 directly assignable to passengers. The \$1,186,500 is now to be divided on a basis of engine ton miles. Let us suppose

that our road uses Mikados in through freight service and Pacific type locomotives in through passenger service, and that the total engine ton mileage in passenger service was 126,240,000, and in

freight service 873,640,000. If X, therefore, represents the proportion of the total \$1,186,500 assignable to passenger service, we have $126,240,000 : 873,640,000 :: X : \$1,186,500$. Thus $X =$

MAINTENANCE OF WAY AND STRUCTURES

On the basis of assigned charges in accounts 202-220, omitting 204-5 and including 272	Engine ton miles	Revenue train miles	Direct	Repairs incurred by each class of service	Assigned charges accounts 388 and 400	Assigned charges locomotive and car repairs	Assigned charges account 202-203 and 220	Basis of use by trains in each class of service	On a basis of power used in each class of service	Basis of accounts 382 and 394
Superintendence; injuries to persons; assessments for public improvements; insurance; stationery and printing; other expenses.	Roadway maintenance; ties; rails; other track material; ballast; track laying and surfacing; paving; removing snow, ice and sand; tunnels and subways; bridges, trestles and culverts; elevated structures.	Right of way fences; snow and sand fences; sheds; crossings and signs; telegraph and telephone lines; signals; roadway machines, small tools and supplies; maintaining joint tracks.	Grain elevators; storage warehouses; wharves and docks; coal and ore wharves; gas producing plants; miscellaneous structures.	Station and office buildings.	Engine houses.	Shops	Roadway buildings.	Inter-lockers.	Power distribution systems; underground power tubes; power line poles and fixtures; underground conduits; power plant dams; power plant buildings; power sub-station buildings; power transmission systems.	Fuel stations. Basis accounts 385 and 397 Water stations.

NOTE.—The above table shows only the division of line expenses. In general the terminal expenses are to be divided in the same way as the line expenses, or rather in an analogous way. Thus the maintenance charge for wharves and docks, where a line charge, is assigned on the use for either freight or passenger service, where a terminal charge is likewise assigned on the basis of use for either freight or passenger service. There are certain exceptions, however, noted below. Accounts 202 to 220, omitting 204 and 205, but adding 272, where a terminal facility, are divided not on the engine ton mile basis but in accordance with the following instructions:

(a) "Common tracks, such as shop, storehouse and repair tracks, to be apportioned on the basis of assigned charges in accounts 308, 314 and 317; engine house, turntable, wye, fuel and water tracks to be apportioned on the basis of assigned charges in accounts 388 and 400." (b) Telegraph and telephone lines, where a terminal charge, are apportioned on the basis of assigned charges in account 373. (c) Maintaining joint tracks, yards and other facilities, where a terminal charge, is apportioned on the basis of respective cars handled at such terminals. In each case depreciation is on the basis of repairs.

MAINTENANCE OF EQUIPMENT

Basis of assigned charges for repairs	Basis of miles run by individual locomotives in each class of service	Basis assigned charges 202-220, omitting 204-5 and including 272	Direct	Basis of power used	Basis of cars handled at terminals
Superintendence; shop machinery; injuries to persons; insurance; stationery and printing; other expenses.	Repairs of steam locomotives; repairs of other locomotives.*	Working equipment repairs.	Freight train cars; passenger train cars; motor equipment of cars; floating equipment repairs; miscellaneous equipment repairs.	Power plant machinery; power sub-station apparatus.	Maintaining joint equipment at terminals.

*Where the locomotives are used in switching, locomotives' repairs are on the basis of time in freight and passenger switching.

NOTE.—The formulas for dividing maintenance of equipment expenses

(terminal) are analogous to those for dividing maintenance of equipment expenses (line). In each case, of course, depreciation and retirements are divided on the same basis as repairs.

TRAFFIC

Direct	50 per cent. of freight and passenger respectively
Outside agencies; advertising; traffic associations; fast freight lines; industry and immigration bureaus.	Superintendents; insurance; stationery and printing; other expenses.

NOTE.—Terminal expenses are divided in the same way as line expenses.

TRANSPORTATION—WATER LINE

Operation of vessels.—The salaries of officers and the cost of fuel for vessels transporting both passengers and freight should be apportioned on a basis of the relative space assigned to passengers and to freight on such vessels.
Operation of terminals.—As above.
Incidentals.—As above.

TRANSPORTATION EXPENSES

Assigned charges 372-406, 408, 415	Basis of total train mileage of freight and passenger trains in territorial units	Direct	Time basis	Basis of freight and passenger gross ton miles in mixed trains	Basis of mileage of equipment used employing power
Superintendence. Stationery and printing. Other expenses.	Despatching trains.	Station employees. Station supplies and expenses. Weighing, inspection and demurrage bureaus. Coal and ore wharves. Operating sleeping cars. Loss and damage to freight. Loss and damage to baggage.	Yardmasters and yard clerks. Yard conductors and brakemen. Yard switch and signal tenders. Yard enginemen. Yard motormen. Fuel for yard locomotives. Yard switching power produced. Yard switching power purchased. Water for yard locomotives. Lubricants for yard locomotives. Other supplies for yard locomotives. Engine house expenses—yard. Yard supplies and expenses. Operating joint yards and terminals—Dr. and Cr.	Train enginemen.* Train motormen. Trainmen. Train supplies and expenses.	Train power produced. Train power purchased.
Basis of freight and passenger trains passing facilities	Basis of located charges of the same account	Basis of assigned charges of all accounts for maintenance traffic and transportation—rail	Basis of service performed	Basis of locomotives handled	Basis of appropriated units of property or persons insured
Signals and inter-locker operation. Crossing protection. Drawbridge operation.	Fuel for train locomotives.* Water for train locomotives. Lubricants for train locomotives. Other supplies for train locomotives. Clearing wrecks. Damage to property. Damage to livestock on right-of-way. Injuries to persons.	Telegraph and telephone operation.	Operating floating equipment.	Engine house expenses—road.	Operating joint tracks and facilities—Dr. and Cr. Insurance.

NOTE.—Transportation expenses, where terminal, are divided in the same way as transportation expenses—line, with the following exceptions: Crossing protection and drawbridge operation, where the expense is terminal, is divided on the basis of accounts 377 to 391 inclusive; operation of joint

tracks and facilities, where terminal, is apportioned on the basis of cars handled.

*This is, of course, only for mixed train service. In freight or passenger service these expenses are charged direct.

GENERAL EXPENSES

On the basis of all accounts other than general	On the basis of all other joint facility accounts.	On the basis of appropriate units of property or persons insured
Salaries and expenses of general officers	General joint facilities.	Insurance
Salaries and expenses of clerks and attendants.		
General office supplies and expenses.		
Law expenses		
Relief department expenses.		
Pensions		
Stationery and printing.		
Valuation expenses.		
Other expenses.		

MISCELLANEOUS OPERATIONS

Direct	No charge
Dining and buffet service.	Produced power sold
Hotels and restaurants.	
Grain elevators.	
Stock yards.	
Other miscellaneous operations.	

about \$171,000. This leaves \$1,015,000 of the total of these charges to be assigned to freight service.

Adding the directly assignable amounts to each of the derived figures we have \$174,400 total charges against passenger service, and \$1,040,100 against freight service. We are now in the position to divide our \$70,000 superintendence charges and have \$174,400 : \$1,214,500 :: X : \$70,000, where X represents the amount of superintendence chargeable to passenger service. X equals, therefore, \$9,970 and the total superintendence charges is divided \$9,970 to passenger and \$60,030 to freight service.

This, of course, is only for line expenses. Superintendence charges for terminal maintenance of way are to be divided as the terminal proportion of the same 202 to 220, etc., accounts are to be divided. The instructions for dividing these terminal accounts are to locate direct where the facilities are used exclusively in either service and to divide the expenses of common tracks, such as shop, storehouse and repair tracks, on the assigned charges for the repairs of steam locomotives, the repairs of passenger cars and the repairs of freight cars, and such other common tracks as engine house, turntable, wye, fuel and water tracks on the assigned charges for engine house expenses, both yard and road—are apportioned on the basis of locomotives handled.

In our example above we have assumed that there were no superintendence maintenance of way charges for terminal expenses.

The complications that arise under the Oklahoma scheme are at once apparent from our example. It consists of wheels within wheels and complications within complications, but so does the operation of a railroad. If a cost accounting system is to be devised for a very complicated set of transactions a minute analysis is necessary and it would be quite surprising if the accounting could be accurately done by means of some simple formula.

New Classification of Expenses

MAINTENANCE OF WAY AND STRUCTURES

	Freight	Passenger	Common
201—Superintendence			\$70,000
202—Roadway maintenance			340,000
203—Roadway—depreciation			60,000
204—Underground power tubes			2,000
205—Underground power tubes—depreciation...			100
206—Tunnels and subways			1,000
207—Tunnels and subways—depreciation			
208—Bridges, trestles and culverts			142,000
209—Bridges, trestles and culverts—depreciation.			40,000
210—Elevated structures			10,000
211—Elevated structures—depreciation			800
212—Ties	\$15,000		140,000
213—Ties—depreciation	600		17,000
214—Rails	6,000	\$3,000	104,000
215—Rails—depreciation	200	100	2,700
216—Other track material			46,000
217—Other track material—depreciation			3,000
218—Ballast	2,000		58,000
219—Ballast—depreciation			5,000
220—Track laying and surfacing	800	300	190,000
221—Right of way fences			5,000
222—Right of way fences—depreciation			600
223—Snow and sand fences and snow sheds			700
224—Snow and sand fences and snow sheds—depreciation			100
225—Crossings and signs			12,000
226—Crossings and signs—depreciation			1,000

	Freight	Passenger	Common
227—Station and office buildings	22,000	10,000	...
228—Station and office buildings—depreciation...	2,200	1,000	...
229—Roadway buildings			7,000
230—Roadway buildings—depreciation			900
231—Water stations			1,000
232—Water stations—depreciation			200
233—Fuel stations			700
234—Fuel stations—depreciation			150
235—Shops and engine houses			22,100
236—Shops and engine houses—depreciation			3,000
237—Grain elevators	700		...
238—Grain elevators—depreciation	100		...
239—Storage warehouses	500		...
240—Storage warehouses—depreciation	50		...
241—Wharves and docks	9,000		...
242—Wharves and docks—depreciation	900		...
243—Coal and ore wharves	3,000		...
244—Coal and ore wharves—depreciation	300		...
245—Gas producing plants .....			...
246—Gas producing plants—depreciation .....			...
247—Telegraph and telephone lines	500	1,500	10,000
248—Telegraph and telephone lines—depreciation			1,200
249—Signals and interlockers			10,000
250—Signals and interlockers—depreciation			1,000
251—Power plant dams, canals and pipe lines—			...
252—Power plant dams, canals and pipe lines—			...
depreciation .....			...
253—Power plant buildings			3,500
254—Power plant buildings—depreciation			500
255—Power sub-station buildings			2,000
256—Power sub-station buildings—depreciation..			200
257—Power transmission system			900
258—Power transmission system—depreciation...			90
259—Power distribution system			700
260—Power distribution system—depreciation...			70
261—Power line poles and fixtures			200
262—Power line poles and fixtures—depreciation.			...
263—Underground conduits .....			...
264—Underground conduits—depreciation .....			...
265—Miscellaneous structures			300
266—Miscellaneous structures—depreciation .....			...
267—Paving			200
268—Paving—depreciation			50
269—Roadway machines			85
270—Roadway machines—depreciation .....			...
271—Small tools and supplies			24,000
272—Removing snow, ice and sand			27,000
273—Assessments for public improvements			150
274—Injuries to persons	19,000	12,000	8,000
275—Insurance			1,600
276—Stationery and printing	2,600	1,000	...
277—Other expenses .....			...
278—Maintaining joint tracks, yards and other			...
facilities—Dr.			46,600
279—Maintaining joint tracks, yards and other			...
facilities—Cr.			83,000

MAINTENANCE OF EQUIPMENT

	Freight	Passenger	Common
301—Superintendence			\$58,000
302—Shop machinery			27,000
303—Shop machinery—depreciation			16,000
304—Power plant machinery			3,000
305—Power plant machinery—depreciation			800
306—Power sub-station apparatus			600
307—Power sub-station apparatus—depreciation..			100
308—Steam locomotives—repairs	\$394,000	\$87,000	15,000
309—Steam locomotives—depreciation	54,000	17,000	...
310—Steam locomotives—retirements	41,000	13,000	...
311—Other locomotives—repairs .....			...
312—Other locomotives—depreciation .....			...
313—Other locomotives—retirements .....			...
314—Freight train cars—repairs			659,000
315—Freight train cars—depreciation			250,000
316—Freight train cars—retirements			78,000
317—Passenger train cars—repairs			51,000
318—Passenger train cars—depreciation			13,000
319—Passenger train cars—retirements .....			...
320—Motor equipment of cars—repairs			14,000
321—Motor equipment of cars—depreciation			6,000
322—Motor equipment of cars—retirements .....			...
323—Floating equipment—repairs		2,000	...
324—Floating equipment—depreciation		700	...
325—Floating equipment—retirements		300	...
326—Work equipment—repairs			21,000
327—Work equipment—depreciation			9,000
328—Work equipment—retirements			400
329—Miscellaneous equipment—repairs .....			...
330—Miscellaneous equipment—depreciation .....			...
331—Miscellaneous equipment—retirements .....			...
332—Injuries to persons			4,000
333—Insurance	1,100	500	...
334—Stationery and printing			5,000
335—Other expenses .....			...
336—Maintaining joint equipment at terminals			...
—Dr.		1,000	...
337—Maintaining joint equipment at terminals			...
—Cr. .....			...

TRANSPORTATION EXPENSES

	Freight	Passenger	Common
351—Superintendence			\$80,000
352—Outside agencies	\$6,900	\$4,800	...
353—Advertising	600	10,000	...
354—Traffic associations	3,000	600	...
355—Fast freight lines .....			...
356—Industrial and immigration bureaus	500	300	...
357—Insurance .....			...
358—Stationery and printing	9,700	2,200	...

TRANSPORTATION—RAIL

	Freight	Passenger	Common
371—Superintendence .....	...	...	\$76,000
372—Despatching trains .....	...	...	104,000
373—Station employees	\$229,000	\$61,000	...
374—Weighing, inspection and demurrage bureaus	35	...	...
375—Coal and ore wharves	12,000	...	...
376—Station supplies and expenses	12,000	8,000	...
377—Yardmasters and yard clerks .....	...	...	59,000
378—Yard conductors and brakemen	186,000	3,000	...
379—Yard switch and signal tenders	2,000	...	...
380—Yard enginemen	114,000	300	...
381—Yard motormen .....	...	...	...
382—Fuel for yard locomotives	99,000	...	...
383—Yard switching power produced .....	...	...	...
384—Yard switching power purchased .....	...	...	...
385—Water for yard locomotives	2,400	300	...
386—Lubricants for yard locomotives	1,900	...	...
387—Other supplies for yard locomotives	4,000	...	...
388—Engine house expenses—yard	41,000	...	...
389—Yard supplies and expenses	6,000	3,000	...
390—Operating joint yards and terminals—Dr... ..	9,000	17,000	...
391—Operating joint yards and terminals—Cr... ..	600	...	...
392—Train enginemen	384,000	91,000	6,000
393—Train motormen	3,000	10,000	...
394—Fuel for train locomotives	597,000	114,000	17,000
395—Train power produced .....	...	7,000	...
396—Train power purchased .....	...	...	...
397—Water for train locomotives	21,000	10,000	1,000
398—Lubricants for train locomotives	10,000	3,000	700
399—Other supplies for train locomotives	16,000	4,000	500
400—Engine house expenses—train	96,000	40,000	...
401—Trainmen	360,000	90,000	14,000
402—Train supplies and expenses	42,000	40,000	1,000
403—Operating sleeping cars .....	...	...	6,000
404—Signal and interlocker operation .....	...	...	14,000
405—Crossing protection .....	...	...	...
406—Drawbridge operation .....	...	...	50
407—Telegraph and telephone operation .....	...	...	...
408—Operating floating equipment	1,600	...	...
409—Express service .....	...	8,000	1,000
410—Stationery and printing	26,000	1,400	...
411—Other expenses	300	18,000	800
412—Operating joint tracks and facilities—Dr... ..	27,000	6,000	...
413—Operating joint tracks and facilities—Cr... ..	20,000	4,000	...
414—Insurance	6,000	200	...
415—Clearing wrecks	17,000	1,000	500
416—Damage to property	3,000	900	...
417—Damage to livestock on right-of-way	1,800	...	...
418—Lost and damaged freight	16,000	2,000	...
419—Lost and damaged baggage .....	...	7,000	1,700
420—Injuries to persons	23,000	...	...

TRANSPORTATION—WATER LINE

	Freight	Passenger	Common
431—Operation of vessels	\$60,000	\$35,000	...
432—Operation of terminals	3,000	7,000	...
433—Incidental .....	...	...	\$300

MISCELLANEOUS OPERATIONS

	Freight	Passenger	Common
441—Dining and buffet service .....	...	\$15,000	...
442—Hotels and restaurants .....	...	1,600	...
443—Grain elevators	\$4,000	...	...
444—Stock yards	16,000	...	...
445—Produced power sold .....	...	...	...
446—Other miscellaneous operations .....	...	...	...

GENERAL

	Freight	Passenger	Common
451—Salaries and expenses of general officers	\$90,000
452—Salaries and expenses of clerks and attendants	135,000
453—General office supplies and expenses	9,000
454—Law expenses	36,000
455—Insurance	2,000
456—Relief department expenses	600
457—Pensions	36,000
458—Stationery and printing	14,000
459—Valuation expenses	12,000
460—Other expenses	400
461—General joint facilities—Dr...	200
462—General joint facilities—Cr...	170

Transportation for Investment—Cr.

FOLK'S NEW HAVEN REPORT

[From an article by The Onlooker in *The Annalist*.]

During Charles S. Mellen's exciting career as a witness immune before the Interstate Commerce Commission in the recent New York, New Haven & Hartford investigation at Washington the commission's counsel, Joseph W. Folk, was a frequent caller at Mr. Mellen's rooms in the Shoreham Hotel. He was, in fact, the only caller outside of a few personal friends, and his repeated visits aroused curiosity. At last one of Mr. Mellen's acquaintances asked him what it was all about—what Folk came to talk over with him. He smiled cynically. It was almost incredible. The counsel of the Interstate Commerce Commission, whose knowledge of New Haven affairs was less than that of the Park Row journalist who openly coached him, came evenings to his chief witness, not to learn anything about

the case, not to get light on obscure episodes, such as the Billard transaction, and not even to fish for clues, but to solicit the former president of the New York, New Haven & Hartford to employ vivid and picturesque language in his testimony on the morrow, for purposes of newspaper headlines.

On leaving the stand the last day Mr. Mellen could not restrain the remark to an acquaintance that he was going back home with about two-thirds of his information intact. The commission's counsel had not known how to get it.

Mr. Folk had no understanding of accounting himself, and had neither the industry to master its perplexities nor the wit to provide himself with experts big enough for the job. For instance, there was the notorious Billard transaction. Several days after Billard himself had been on the stand, and had succeeded in leaving the subject as bedimmed as it was before, a New York journalist arrived to hear the Mellen testimony first hand. He spent his leisure time going over the Billard testimony. In the official stenographer's record he found references to certain financial exhibits marked, "Billard A, B, C, D, E, and F," which had not been copied into the record. He first applied for them to Billard's personal counsel, who was staying over, but his only copy of the exhibits was in New England. Next the journalist applied to Mr. Folk, who stared at him blankly; he did not know anything about them. His attention was called to the reference in the record at the place where the exhibits were offered in evidence and marked, "Billard Exhibits A, B, C, D, E, and F." He shook his head. Possibly the accountants knew. Ask them. The accountants, too, had forgotten them. By the record it was clear that such exhibits did exist, but nobody knew where to look for them. A search was insisted upon, and after half an hour the exhibits were found in the bottom of a clothes basket full of other papers and documents. The journalist copied them off and then tried to analyze them. They did not analyze, that is, the figures did not balance, as any capable accountant must have been able to see upon five minutes' study, but Billard had been allowed to stand on them, as they were, and to leave a hopeless record of the transactions carried on in his name by the New Haven Railroad. A competent accountant ought to have been able to take those figures, start at the beginning and force either Mr. Billard or Mr. Mellen step by step into a corner out of which either the truth or the bald refusal of it had been bound to come.

"What would you have done," the journalist asked Mr. Mellen, "if a man who knew accounting had forced you through those figures to the point of the ultimate question?"

"I would have been obliged to tell things I did not tell," he said. "I was not there to volunteer information they did not know how to get."

And so it stands in the record and in the conclusions of the Interstate Commerce Commission that John L. Billard retained more than \$2,700,000 in a transaction in which he represented the New Haven Railroad, and in which he invested not a dollar of his own. That is not true. That was the apparent difference in the par value of securities, but the actual value of what Mr. Billard came off with, clear and free, was probably under \$1,500,000. It was after Mr. Mellen retired, and through a trade with the new management, that he got a final profit at all. The investigators did not go into that; they probably did not know how. It may be said that \$1,500,000 was as preposterous as \$2,700,000; but the point is that the Interstate Commerce Commission failed to get the truth, and, failing, let it go at that.

THE RAILWAYS OF NIGERIA.—It is said that Nigeria is so swampy that horses and mules do not thrive in it and that, therefore, transportation is dependent entirely upon roads for foot traffic, railways and the waterways. Besides a seacoast of about 500 miles, the country has more than 1,000 miles of navigable inland waterways and over 900 miles of railway, a little over 700 of which is of 3 ft. 6 in. gage and 200 miles of 2 ft. 6 in. gage. There are also about 500 miles of new railway line under construction.

New Low Grade Line from Tacoma, Wash., to Tenino

This 44-Mile Section Completes Northern Pacific Double Track Road Between Seattle and Portland

The Northern Pacific is now completing a double track low grade line from Tacoma, Wash., south 43.7 miles to Tenino, to replace the existing single track line between those points. The new line is on an entirely new location removed several miles from the present one and involves some very heavy construction work under unusual conditions. The building of this line completes the reconstruction and double tracking of the entire line from Tacoma, south to Portland, thus providing double track from Portland to Seattle.

TRAFFIC

In addition to the traffic of the Northern Pacific, the Great Northern also operates over the tracks of the Northern

ary 1, 1910, and the Great Northern on June 19, following, at which time work had already been begun on the reconstruction of the line and building a second track from Tenino south to Portland. With the inauguration of this additional train movement the demand for increased facilities became more urgent and the work was prosecuted vigorously until the second track south of Tenino was placed in operation late in 1911. In rebuilding this portion of the line, numerous changes in grade and alinement were made so that the ruling grade south of Tenino is now 0.3 per cent. in each direction with the exception of five miles of one per cent. grade ascending both ways to Napavine, 25 miles south of Tenino.

CHARACTERISTICS OF OLD AND NEW LINES

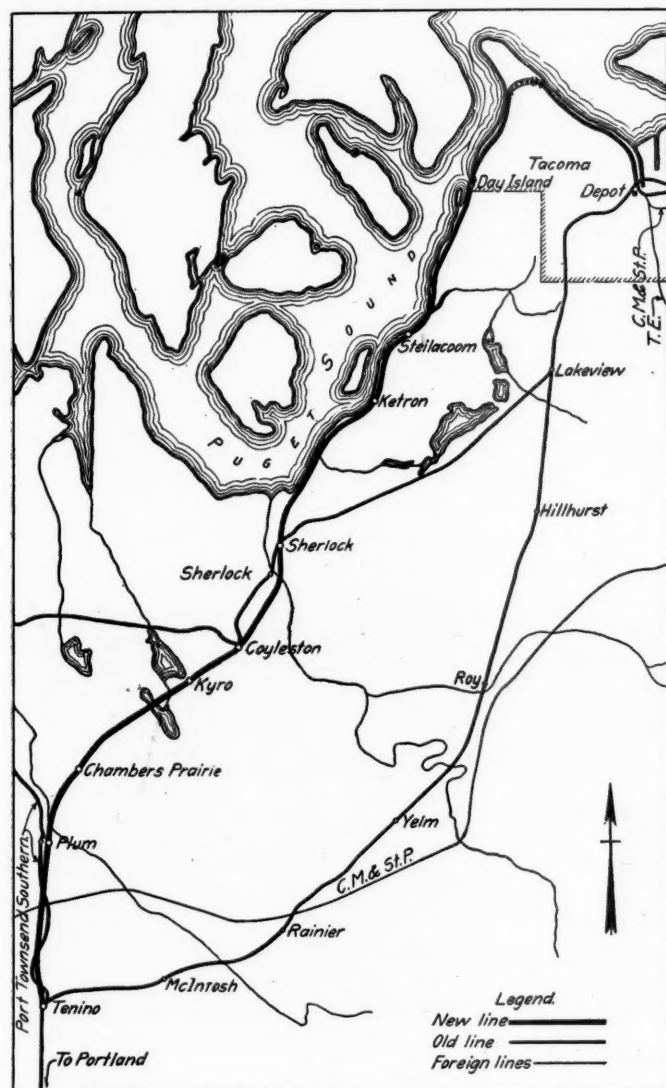
North of Tenino the grade on the old line is very broken and consists largely of one per cent. grades in both directions, with 2.2 miles of 2.2 per cent. grade ascending directly from the station at Tacoma. The maximum curve on the old line is 10 deg. The tonnage rating southbound is now 2,000 tons with helper service up the hill from Tacoma; switch engines from the yard are used for helper service, three such locomotives being required as helpers on a tonnage train.

The heavy through traffic of all three roads between Portland and Tacoma is materially increased by local traffic of the Northern Pacific coming onto this line from the Moclips branch at Centralia, from the South Bend branch at Chehalis, and from the Olympia branch at Lake View. This traffic, combined with the physical characteristics of the old line, made necessary the inauguration of radical improvements north of Tenino. The topography along the old line made the construction of a low grade line on this location impractical and an entirely independent line was located.

Starting from Tenino the new line follows in a general way the location of the Port Townsend Southern, a subsidiary of the Northern Pacific, for six miles to Plum, and then continues northeast 16 miles across Patterson Lake to the east shore of Puget Sound. The line then follows the east shore of Puget Sound for 16 miles to Point Defiance, Tacoma, passing through the point in a tunnel 4,391 ft. long to the south shore of Commencement Bay, which it follows for five miles to a connection with the old line at the entrance to Tacoma station.

The distance by way of the new line, as compared with the old, is increased from 39.18 miles to 43.71 miles and the curvature from 824 deg. to 1,347 deg. However, the ruling grade southbound is reduced from the 2.2 per cent. out of Tacoma and one per cent. elsewhere to a maximum of 0.3 per cent., compensated in both directions. With the exception of the 0.3 per cent. grade in the Point Defiance tunnel, provided for drainage, there is practically no adverse grade against northbound trains. The total rise and fall on the new line is 421 ft. as compared with 1,244 ft. on the existing line. The maximum curve is also reduced from 10 deg. on the old line to three deg. on the new. With the locomotives now in use on this division, the new grade will permit an increase in the tonnage to 3,000 tons southbound, limited by the Napavine hill, and will increase this rating still more as far south as Centralia and Chehalis by filling out with cars for these branches, in this way decreasing the mileage of these branch line trains between Tacoma and Chehalis. Because of the rapidly increasing traffic on this, the only north and south line along this portion of the coast, the new line was located as a four track line, of which the two westerly tracks are now being built.

The situation at Tacoma station will also be materially



Map Showing Location of New and Old Lines Between Tacoma and Tenino

Pacific from Seattle to Portland, and the Oregon-Washington Railroad & Navigation Co. from Tacoma to Portland. Thus, although this line is the only one from Portland north to Puget Sound points, it is used by all three of these trunk lines on an equal basis; it carries 22 regular scheduled passenger trains daily in addition to an average of about 18 freight trains.

The O. W. R. & N. started operation over this line on Janu-

were planked solidly with six inch planks to the elevation of mean high tide.

As this timber seawall was completed, the contractor placed a deck on it and used it as the construction trestle on which he brought out his material to construct the embankment. This material was for the most part loaded by steam shovels working in cuts where the line crossed points extending into the Sound or in borrow pits, although in some instances material was sluiced directly from high banks into the fills. As



Constructing Heavy Fill at Approach to Patterson Lake

the fill was widened out sufficiently behind the wall, the contractor threw his track onto it and raised it to subgrade two feet above the top of the caps. The center of the nearest track was 15 ft. 6 in. inside of the center line of the seawall trestle.

The waters in Puget Sound are seriously infested with teredo which attack the piling up to about 10 ft. above low tide. Although timber given a heavy penetration of creosote is practically immune to the attacks of the teredo for some time, untreated piles were used for this wall as it was not considered necessary to go to the increased expense of using



Making Fill Across a Sink Hole at Patterson Lake from a Trestle Carried on a Raft

treated piles when in any event it would be necessary to protect the bank ultimately with riprap. Accordingly, as fast as a portion of the embankment was completed it was protected with a heavy facing of stone, although in several instances piles were entirely cut off by the teredo and rose to the surface before this riprap could be applied; the life of this timber, in some instances, not exceeding three months.

About 250,000 yd. of rock were required for the protection of this embankment and the specifications required that 90 per cent. of it must be one cubic foot in volume or larger, allowing up to 10 per cent. of spalls. This material was brought in by scows from Waterman and was placed by con-

tract by means of one floating derrick, one derrick working from the seawall and one outfit of scows dumping directly at high tide. The lower portion of the wall was made by these scows and it was completed by the derricks. The finished wall stands on a 1:1 slope up to the top of the timber sheeting and is then inclined on a flatter slope to the shoulder of the embankment as shown in the sketch. Approximately 522,000 lineal feet of fir piling were required for this seawall, all of which was specified to have a minimum of nine inches of heart wood. In addition, 7,220,000 ft. B.M. of timber other than piles was required and over 1,368,000 lb. of iron.

POINT DEFIANCE TUNNEL

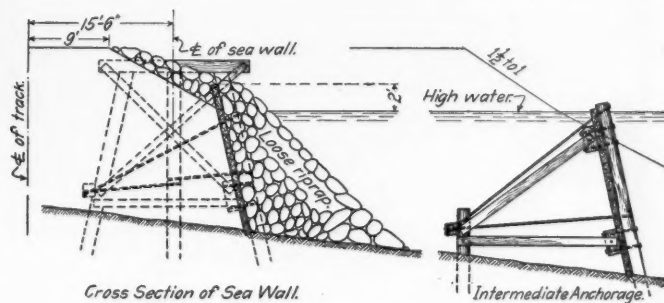
Next to the seawall the most interesting problem was the construction of the Point Defiance tunnel through the projection between Commencement Bay and Puget Sound proper, just outside the city limits of Tacoma. This tunnel is 4,391 ft. long and is built for two tracks on a 0.3 per cent. grade each way from the center to provide drainage. It is on tangent with curves at each end. The material through which it



Completed Portion of Sea Wall and Embankment

was driven is very fine sand. Work on this tunnel was pushed from both ends with shields. Wall plate drifts were first driven, followed closely by the shields supported on these wall plates. These shields were driven forward with twelve 80-ton hydraulic jacks with a limit of movement of one foot. The timbering followed immediately behind these shields.

Motor driven belt conveyors carried the material excavated from the wall plate drifts out onto the bench. Similar conveyors carried the muck out from the center drift. At the east end a bottom center drift was then driven at grade sufficiently large to permit a dump car to enter and the remainder of the material was trapped into cars. At the opposite end the bench was taken out with a Marion 40 air

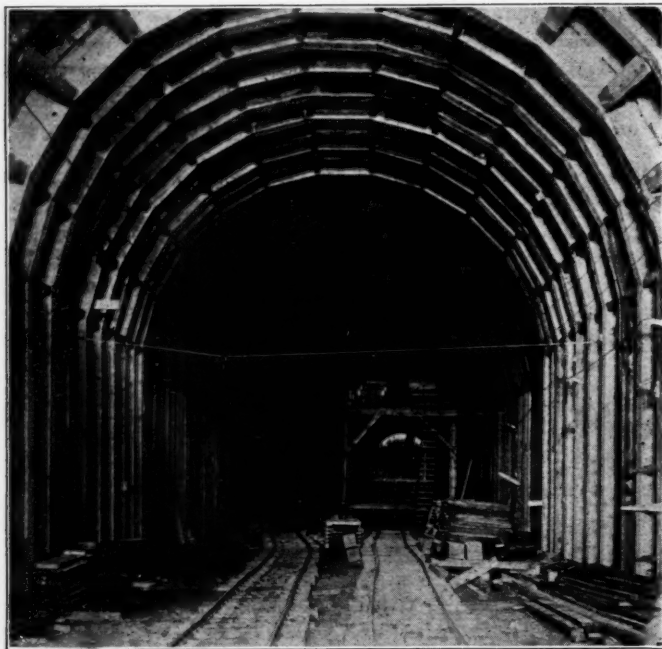


Sea Wall Along Puget Sound

operated shovel loading into small cars which were handled by an electric locomotive. Work on this tunnel was started late in April, 1912. It was holed through on June 11, 1913, and the last of the bench material was removed on June 21. The maximum distance driven in one month was 731 ft. in May, 1913.

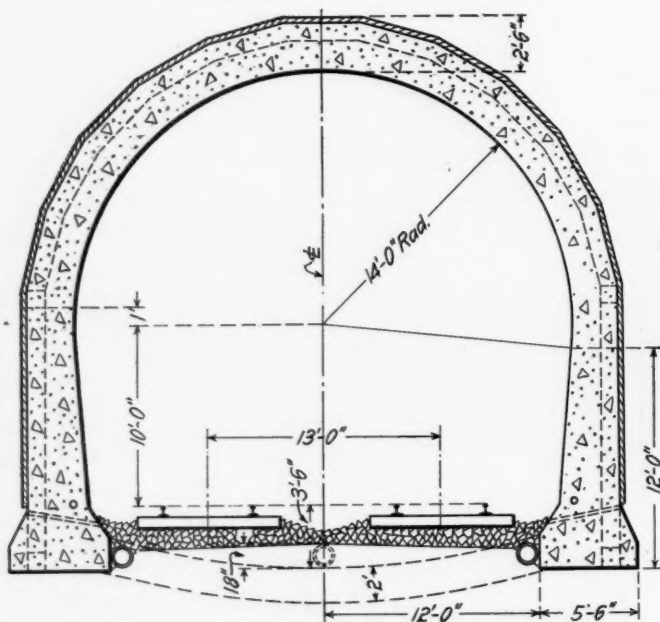
In lining the tunnel with concrete, alternate ribs only were

removed and the remaining timbers were concreted in place. The concrete mixing plant at the east portal is shown in one of the photographs. Stone and sand were elevated into storage hoppers above the mixer with a belt conveyor and cement was stored in the adjoining shed. The concrete was dumped into cars which were hauled into the tunnel with a small



Interior of Point Defiance Tunnel Showing Timbering

electric locomotive. The cars were then hoisted and dumped onto an elevated platform which was mounted on four trucks running on two tracks and moved forward as the work progressed. The concrete was shoveled into the sidewalls or arch ring by hand. About 120 yd. of concrete was deposited by each plant at each shift. The cross section of the

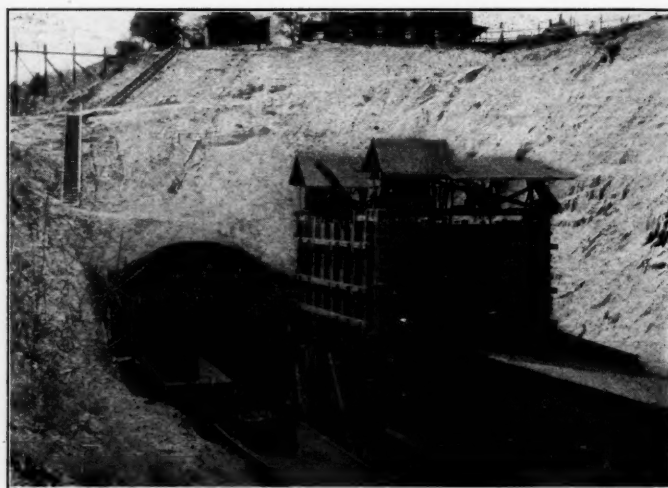


Cross-Section of Double Track Tunnel at Point Defiance

wall required $7\frac{1}{2}$ cu. yd. of concrete per lineal foot, enabling a 16 ft. section of the arch to be keyed up daily. This lining required 39,000 cu. yd. of concrete in addition to 3,710,000 ft. B.M. of timber. Power for operating the locomotives, for lighting the tunnel while this work was in progress and for

running the mixers was generated by a plant at the west portal.

Another tunnel 300 ft. long was built through heavy blue clay a short distance east of the long one. Side drifts were first driven on the elevation of the wall plates and were then widened until the entire arch section was excavated. Wall benches were then driven, the sidewalls were built and the arch rings put in, after which the center bench was removed. This tunnel was also driven from both ends. Construction

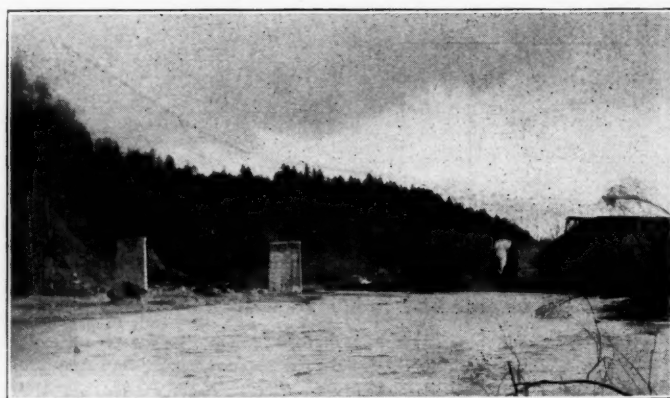


Concrete Mixing Plant at Entrance to Point Defiance Tunnel

was complicated somewhat by an agreement with the town of Rustin in which it was located, providing that a roadway tunnel which the city desired to construct alongside the railroad, be driven first and the intermediate wall be used in common. Delay in completing the city's portion of the work held up the railway for some time but not sufficiently long to delay the opening of the line.

OTHER CONSTRUCTION FEATURES

Three steel bridges are required. The Des Chutes river is crossed seven miles north of Tenino on one 150 ft. deck truss and two 50 ft. deck girder approaches. The Nisqually river is crossed 11 miles farther north on three 150 ft. deck trusses and two 100 ft. approach spans. At Steilacoom an 80 ft.



The Substructure of the Nisqually River Bridge

Strauss direct lift bridge was built with a creosoted timber approach. Creosoted pile structures were also built at Wilton Waterway, Bay Island and two other points along the Sound, care being taken to secure a heavy penetration of creosote to render this timber immune from the attacks of the teredo.

Smaller openings were provided for with concrete pipe made by the railway company at a plant built especially for

this work at Auburn, Wash., 18 miles north of Tacoma, and described in the *Railway Age Gazette* of February 20, 1914. This pipe was made in 24 in. and 36 in. sizes, over 10,000 lineal feet of each size of pipe being required. About 200 concrete piles were also cast in this yard for use under the ends of the girder approaches to the longer spans.

This new line is laid with 90-lb. open hearth rail on untreated ties. After the completion of the line, all through traffic will be routed over it, but the old line will continue to be operated for local traffic.

This road is being built under the direction of W. L. Darling, chief engineer, Northern Pacific; J. C. Breedlove, assistant engineer, is in direct charge of the work to the city limits of Tacoma, while that work within the city is being handled under the direction of A. R. Cook, principal assistant engineer. All bridge work was designed under the direction of H. E. Stevens, engineer of bridges. Porter Brothers, Grant, Smith & Co., Portland, had the contract to build the foundations for all bridges and to do all grading, track laying and ballasting on this line south of the tunnel and the Keasal Construction Co. had the contract north of the tunnel for the grading and masonry work. Nelson Bennett, of Tacoma, had the contract for the tunnels.

GENERAL FOREMEN'S CONVENTION*

At the Thursday morning session A. P. Prendergast, superintendent of machinery of the Texas & Pacific, addressed the association. Mr. Prendergast emphasized the need of good treatment of employees and urged that provision be made for their comfort, and also that good tools be provided for them or they cannot do good work. A large percentage of employees will follow the example of their leaders, and it is therefore necessary that supervising officers use care in conducting themselves. He urged foremen to study the personality of the individual workmen so that they may be assigned to work for which they are best fitted. He also placed considerable stress on the help which can be obtained by carefully reading railway technical papers. The address was replied to by Dr. Angus Sinclair.

VALVES, CYLINDERS AND PISTONS

J. T. Mullin presented a paper from which the following is taken:

Piston valves on superheater locomotives should be examined once every 30 days, as a great deal of carbonization accumulates on them. Piston valves with the Stephenson valve gear should be set with negative lead to obtain the greatest efficiency from superheater locomotives. Piston valves and valve chambers when worn 1/32 in. should be rebored, and new valve rings should be a perfect fit in the valve chamber and should be 3/32 in. larger than the chamber. Old rings reapplied in the shop or engine house should be at least 1/16 in. larger than the valve chamber.

It has been found on locomotives converted from saturated to superheated steam that the cylinders have a tendency to crack leading from the valve chamber to the receiving ports of the cylinder. In order to overcome this we are applying a cross-brace from front to back between the valve chamber and the cylinder, shrinking it and drawing the metal together in order to hold it when under the high temperature. This has overcome the cracking of this part of the cylinder.

Pistons should be examined every shopping as in some cases they are apparently in good condition until examined, when they are found to be worn flat.

Discussion.—With the Stephenson valve gear a number of roads follow the practice of keying the eccentrics to the main axle before the wheels are under the engine. A record is kept of the position of the eccentrics so that the practice may be uni-

form on different engines of the same class. The Lackawanna has found trouble on superheater locomotives with the graphite lubricator because of carbonization, causing the piston rings to tilt, and blows resulting. It was stated that much trouble with valves may be eliminated by removing the relief valves and instructing the men to work steam to a stop. The practice of examining valves and piston rings periodically, generally every thirty days, seems to be quite general, but one member did not think it was necessary. He claimed that this method was too expensive and that satisfactory results could be obtained by the enginemen reporting trouble after it starts. Several members expressed the opinion that lack of lubrication was the cause of much cylinder and valve trouble where a little more oil would save much repair expense on rings and bushings. Two roads have done away with piston rod oil cups on superheater locomotives and use swabs with valve oil. This has been found to reduce carbonization, as the enginemen, it was claimed, will use low grade oil in the oil cups and this carbonizes very easily.

AUTOGENOUS WELDING

C. L. Dickert (Central of Georgia) presented a committee report of which the following is an abstract:

Literally speaking, the methods mentioned in these papers would not come under the head of autogenous welding, but as we know and speak of them as such we have included them.

Each method has its advantages; the electric, for welding flues to the back flue sheet, I believe, has the field to itself. However, the oxy-acetylene advocates claim great progress along this line. For cutting, the oxy-acetylene process is in a class by itself; there is a difference of opinion as to which is best on a general run of boiler work. Economy and efficiency are the two main points to consider.

We have the electric and oxy-acetylene plants installed at Macon shops, and have done quite a lot of welding with both, but I am not in a position to give a comparative cost or the efficiency of the two methods. We at first installed the oxy-acetylene plant and used this method altogether, and about two years later we installed the electric. Shortly after the electric outfit was going, we had an accident occur to the acetylene plant. We then had to resort to the electric for all classes of welding. We have just about completed our new acetylene plant and have made a few tests on side sheets with the electric and oxy-acetylene. One of our greatest troubles is breaking in operators and holding them after they have learned to handle the torch successfully. Each craft does the welding of metals that originates in its respective department; blacksmiths handle all wrought iron, steel and cast steel; boilermakers all boiler plates and flues; machinists, cast iron; and coppersmiths do all the brass and pipe work.

One great defect is that its use appears too easy, and it is applied in all sorts of ways. The operators, as a rule, give it but little study, which is responsible for practically all failures, as the average mechanic, these days, devotes but little time to study on the things pertaining to his trade. A blacksmith of the right caliber would, in my opinion, be the right man to handle the welding, as he has more knowledge of heating metals, taking care of expansion and contraction, etc., than mechanics from other departments. At any rate, whoever is put on the job should have a competent instructor, and should be furnished with all the reading matter that is published from time to time on the subject, so as to familiarize himself with the work.

Autogenous welding has enabled the railroads to reduce the cost of repairs, increase mileage of flues, prolong the life of fire-boxes, reclaim worn parts of locomotives, repair broken parts of machinery, and numbers of other savings. All large shops, to have a complete arrangement, should have all the systems.

Electric Welding.—A field in which electric welding has proved very successful and profitable, is that of welding flues to back flue sheets. We have in service today over 90 locomotives with flues welded to the back flue sheet, making a total of about 27,000 flues. Out of this number of locomotives in service with

*See *Railway Age Gazette*, July 17, 1914, page 105, for report of the first two days' proceedings.

flues welded, we have our first engine to fail on the road from flues. We have, however, had some few flues leak after being in service a short while, which was due to bad beads when they were welded in. If part of the bead is off, exposing the copper, it is very difficult to get a good weld.

When new flues are to be welded, we apply them in the usual manner, with copper ferrules, rolling the bead and prossering. A heavy bead is built up in welding to the flue sheet. This leaves a rough finish. Some roads shape up the beads with a cutter, while others go over them with a beading tool to smooth them over. We find this is not necessary.

Where flues that have been welded in are to be removed, it only requires a few hours longer to cut off the beads, and we find that the flue sheet is in better condition than before welding in flues, as welding builds up the sheet around the flue holes to about the original thickness. We have a tool for facing off the rough surface after the flues are removed, making a good clean sheet for applying new flues.

Welding in half side sheets and patches, repairing mud rings, etc., has proved very successful with the electric process.

Electric welding has proved valuable in filling up worn links, link blocks, blade jaws, saddle pockets and cellar bolt holes in driving boxes; welding new notches in quadrants, worn places in frames caused by spring rigging wearing; building up piston fits to crossheads, rod ends and straps; in fact everything that is worn or broken that it is possible to reclaim at a profit. There is no limit to its usefulness, as we always find something new to be done.

Oxy-Acetylene Welding.—The oxy-acetylene process of welding and cutting has passed the experimental stage, and has made a more rapid growth in the past few years in railroad work than in all the preceding years combined. For cutting it has the field to itself.

Oil Welding.—Oil welding of locomotive frames has been the practice at Macon shops for the past two years. Quite a number of welds have been made during this time which have proved very successful. The success of oil welding, like all other methods of frame welding, depends largely on allowances made for expansion and contraction.

There is but little expense attached to this method of welding. The outfit consists of a small oil burner, an oil tank and two small battering rams. The entire outfit is mounted on a four-wheel truck which is easily handled around the shop. The material used is crude oil, fire brick and fire clay, which amounts to about \$2; the balance of expense is for labor, which amounts to about \$6; making a total cost for preparing and welding frames on an average of \$8.

The Chicago & North Western is using three methods of welding with very good results in each case: oil welding, thermit and oxy-acetylene welding. If there are any light frames broken, say through the pedestal jaw or lower rail, or back braces, they resort to oil welding as it is considered much cheaper and quicker than any other process. For broken frames on heavy power thermit is used almost entirely, and with very great success. They have had one or two cases where the frames have broken again at the weld, but it is not believed that the thermit was to blame so much as the men doing the job, in not allowing enough for contraction in the cooling process, and thereby putting an undue strain upon that part of the frame.

The Delaware & Hudson uses both the electric and oxy-acetylene welding processes. On boiler work they weld in flues, small cracks, seams, mud rings, etc. With boiler work this has not proved entirely successful, due to leaks that develop later and have to be corrected. However, they are making progress along this line, and are continuing its use.

The oxy-acetylene system they have had going about one year, starting with portable oxygen and acetylene tanks. The class of work done includes the welding of various castings when defective, building up of the worn surfaces on the heavier castings, as this is a surer process than the electrical welding of engine frames, which is not always successful, welding engine

truck frames and cradles, all frame braces and brackets, plugging holes in heavy motion work parts, reclaiming nearly all tender bolsters, guides and pedestals, cracked locomotive bells, etc. On boiler work they weld in all firebox door sheets when they join in the fire door hole, and apply patches to boilers, which is not always successful, due to the tendency to crack on cooling. They also apply sections to flue sheets and weld broken bridges. These also have to be frequently gone over the second or third time on account of cracks due to contraction.

In repairs to fire door cracks, experience strongly indicates, for back shop practice at least, that better results are obtained by cutting out the cracks, replacing by patches the sizes of which are governed by the nature and size of the crack. Merely welding up old fire door cracks usually leads to future trouble, since the crack starts from the inside and can be only partially seen from the outside with the result that all of the crack is not completely welded up, and possibly cracks existing on the water side and not visible from outside may be increased by the strain of contraction from the heat of welding a closely adjoining crack. By cutting out cracks which are visible from outside and welding in patches of new material this trouble is eliminated. The Atlantic Coast Line has experienced excellent success with boiler repairs made by the oxy-acetylene process at the Waycross, Ga., shops, including some radical departures over the old method of repairs.

The report is signed by C. L. Dickert, chairman; R. B. Van Wormer, A. C. L.; C. M. Newman, A. C. L.; A. A. Masters, D. & H.; F. P. Miller, C. M. & St. P., and Wm. Hall, C. & N. W.

Discussion.—The discussion of this paper was entered into with a great deal of interest, and on the subject of oxy-acetylene welding, Mr. Byers, of the St. Louis & San Francisco, presented considerable information on the work done at the new Springfield shops of that road. The shops are piped for acetylene gas and 20 welders are kept busy performing various classes of work. From July 1, 1913, to June 30, 1914, that shop consumed 856,700 cu. ft. of oxygen and 108,800 lb. of carbide, and it was estimated that a saving of \$83,191.60 was obtained by the use of this process, the following table giving a list of the amount and kind of work during this time:

Parts	Pieces	Parts	Pieces
Ashpans	637	Shop machines	692
Brackets	391	Main rod brasses	8
Braces	661	Miscellaneous repairs	473
Bolsters	13	Main rods	146
Crossheads and pistons	254	Miscellaneous parts	4,914
Center castings	26	Oil boxes	531
Center plates	2	Pedestals	626
Cylinders	23	Reverse lever strips	368
Driving boxes	240	Rocker arms	100
Drawbars	12	Running boards	374
Driving wheels	3	Steam chests	5
Door collars and sheets	400	Steam pumps	10
Deck castings	1	Side sheets	495
Equalizers	236	Steam pipes	62
Engine frames	567	Truck boxes	113
Front end ring	45	Truck frames	14
Firebox work, misc.	3,017	Triple valves	2
Lubricators	3	Water columns	4
Flue sheets	261		

Mr. Byers stated that all firebox side sheets are welded in and that good success has been obtained with welding frames, there being only two failures out of 77 frame welds made. It has, however, been found difficult to get a satisfactory weld with cast iron, only one man having been found who could do this so that it could be machined. It is necessary to have expert men to perform oxy-acetylene welding, and it has been found that blacksmiths make the most apt students. In welding tubes in the tube sheets, Mr. Byers stated that it is not necessary to use the copper ferrules.

Other members could not report as all-round good success as did Mr. Byers, and attributed their trouble to inexperienced help.

Those roads using electrical welding have found it very successful, being able to weld more difficult jobs than they could with the oxy-acetylene process. C. L. Dickert, of the Central Railway of Georgia, claimed that an electrical welding outfit would pay for itself by its success in welding tubes, and the results have shown that 22 tubes could be welded per hour by one man. With this process he has been able to fill up wrist-

pin and knuckle-pin holes and flat spots on tires very satisfactorily. Thermit welding has proved generally successful. On the Chicago & North Western at Clinton, Iowa, out of 154 thermit welds, there were only five failures, three of these being man failures. Other roads reported equally good results.

AIR BRAKE REPAIRS

The following is an abstract of a paper by Chas. M. Newman (Atlantic Coast Line):

The maintenance of the air brake depends largely on five principles: Accessible location of parts which require frequent attention; proper installation; methods of inspection; to what extent terminal repairs are made; methods of making repairs to the principal parts.

Accessible Location.—As an assistance to maintenance, this is very important. When time is short and many repairs are to be made, the parts most accessible will receive the attention and those inaccessible will be neglected. This results in lowering the efficiency of the brakes, in neglect of equipment and in increase in the cost of maintenance. I have seen air pumps located so close to the running board that it was next to impossible to remove the bottom head or a valve cap without removing the pump or the board.

Proper Installation.—A good air brake equipment improperly installed is an expensive device from which efficient service cannot be obtained. The heart of the equipment, the air pump, should be made perfectly secure in its location, and so located that the intake will not be in a position to get the dirt and grit from the running boards or ashes from the pans when fires are being cleaned or dumped. Reservoirs and other parts which have several pipes connected should be fastened to some place as free from vibration as possible and the fastening made securely, as improper installation and location of such parts are responsible for a great many leaks and broken pipes. When a distributing valve is used, it should be applied to substantial brackets and these to a place free from vibration. As little drop as possible for the brackets will prevent some vibration. Brake valves and signal valves should not be located too close to the boiler, as excessive heat interferes with their efficient operation.

Gages should never be fastened directly to iron brackets, but small blocks of soft wood, of a uniform thickness, should be used between the gage and the bracket. Too much cannot be said on the proper installation of piping. Many failures to engines and cars on account of defects in the air brake equipment can be traced to badly clamped and crooked pipes, or pipes with an insufficient number of clamps, or clamped or bent in such a manner as to form pockets. All piping should be put up with as few elbows as possible, using easy bends instead.

Methods of Inspection.—Before any engine leaves the engine house its entire air apparatus should be given a thorough inspection and test by competent men, and all perceptible defects corrected. The air pump should be given an efficiency test to make sure that it is capable of supplying the necessary quantity of air under ordinary conditions.

Something which is very frequently overlooked by inspectors, especially on locomotives, is the matter of the brake levers, beams and hangers being the correct ones for the type of engine. Frequently, a repair man, at an outside point, will replace one of these with one the nearest to the correct one that he has. This lever may increase the braking power and under unfavorable conditions would cause wheels to slide; or he may have decreased the braking power by applying a light beam or the wrong hanger, which reduces the efficiency of the brakes.

The proper time to inspect a train is on its arrival. To do this, the incoming engineer should add to the reduction required to stop, enough to fully set the brakes on the train. The inspectors should be present and make an immediate examination and bad order all defective brakes. In seeking accessible places to make brake tests and inspection without loss of time, extra switching or danger to workmen, the freight house and transfer tracks should be considered. Here, the number of cars handled

per day is considerable, and these tracks should be supplied with compressed air and full advantage taken of this excellent opportunity of locating and remedying defects.

Terminal Repairs.—Good brakes depend on the attention they receive at the terminal. You cannot depend on the repair tracks in shops keeping up the air brake equipment. All defects noted by the inspectors should be corrected. At the very best, the regular terminal test of brakes on engines or cars misses many of the defects, and for that reason it is important that as few defects as possible be allowed to escape repair. However, it does not follow that the repairing of defective brakes cannot be done without delay to cars which should go forward promptly.

Such repairs as ordinary brake pipe leaks, defective hose gaskets, wrong piston travel, etc., which require little time should be made on the service tracks; but cars requiring heavy brake repairs should be marked for the repair tracks. Here is where good judgment must be exercised, as perishable or other very important loads or empties needed for such lading must not be delayed. By assigning a certain track in important terminal yards for air brake repairs, which require more time than the ordinary repairs made on the service tracks, and a few men with the necessary repair materials, such cars are often repaired and go forward in the first train out, and very few are allowed to go forward without repairs being made. All cars in shops or on repair tracks with cleaning dates over nine months old, should have their brakes cleaned and lubricated. Not only will the condition of brake cylinders and triples fully warrant this, but it is improbable that these cars will be so favorably located again for months, without causing delay and switching.

When triples need cleaning, it is not a good policy to do it on the repair or service tracks, but they should be removed and sent to the shops, or some place fitted with a test plant, so that, after the operation of cleaning and lubricating, they can be placed on the test rack and given the required test; then they are ready to be replaced on the car or engine, and efficient operation is assured.

Another apparently small defect will be found on almost every train which is carefully inspected is air leaks. A large railroad, which operates long trains successfully, has an allowable maximum train line leakage as follows: For trains of from 25 to 50 cars, 7 lb. per min.; for trains of from 50 to 75 cars, 6 lb. per min.; for trains of 75 cars or over, 5 lb. per min.

Methods of Making Repairs.—Practically all of our air brake parts are removed and applied to the locomotive by handy men and helpers. When carried to the air brake department for overhauling, the work is done by specialists; that is, handy men or mechanics who have been trained in each line. By using men in this manner, we get the highest efficiency from the man on each part.

Discussion.—The chief point brought out was that the different parts of the air brake apparatus should be placed in more accessible places, giving an opportunity to repair and inspect them readily. A change in the design of the air pump piston rods from the shoulder to the tapered fit of the piston was believed to be needed; where it has been done a reduction in broken piston rods has been experienced.

THE TAYLOR SYSTEM

A subsidiary paper on this subject was presented by W. W. Scott (D., L. & W.) in which he said, in part:

After a careful analysis of the scientific principles of either the Taylor or Emerson school, we may find in many of the details, nothing entirely new in doing work. The shop manager may have a much better way in handling some detail; but the new principles should not be confused with methods. If you have the principles of scientific management and a purpose to carry them out, any man may get results, though his methods of applying the principles may vary.

The history of the development of scientific management calls for a word of warning. The mechanism of management must not be mistaken for its essence or underlying philosophy. Pre-

cisely the same mechanism will in one case produce disastrous results and in another the most beneficial. The same mechanism which will produce the finest results when made to serve the underlying principles of scientific management will lead to failure if accompanied by the wrong spirit in those who are using it.

ELECTION OF OFFICERS

The following officers were elected for the ensuing year: President, W. W. Scott, general foreman, D., L. & W., Buffalo, N. Y.; first vice-president, L. A. North, superintendent of shops, Illinois Central, Chicago; second vice-president, Walter Smith, Chicago & North Western, Chicago; third vice-president, W. T. Gale, machine foreman, Chicago & North Western, Chicago; fourth vice-president, W. G. Reyer, general foreman, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; secretary-treasurer, Wm. Hall, Chicago & North Western, Winona, Minn.

CLOSING EXERCISES

J. Hannahan, formerly chief of the Firemen's Brotherhood and now a representative of the Locomotive Stoker Company, addressed the association, pointing out to the members the necessity of all railroad men working together to prevent so much adverse legislation that has proved to be merely political ammunition. Every railroad man should exert what influence he can to impress his representatives in either the state or federal legislatures, that they should treat the railroads fairly. He also spoke of the vast opportunities ahead of general foremen, mentioning a number of prominent men who have worked up through this position.

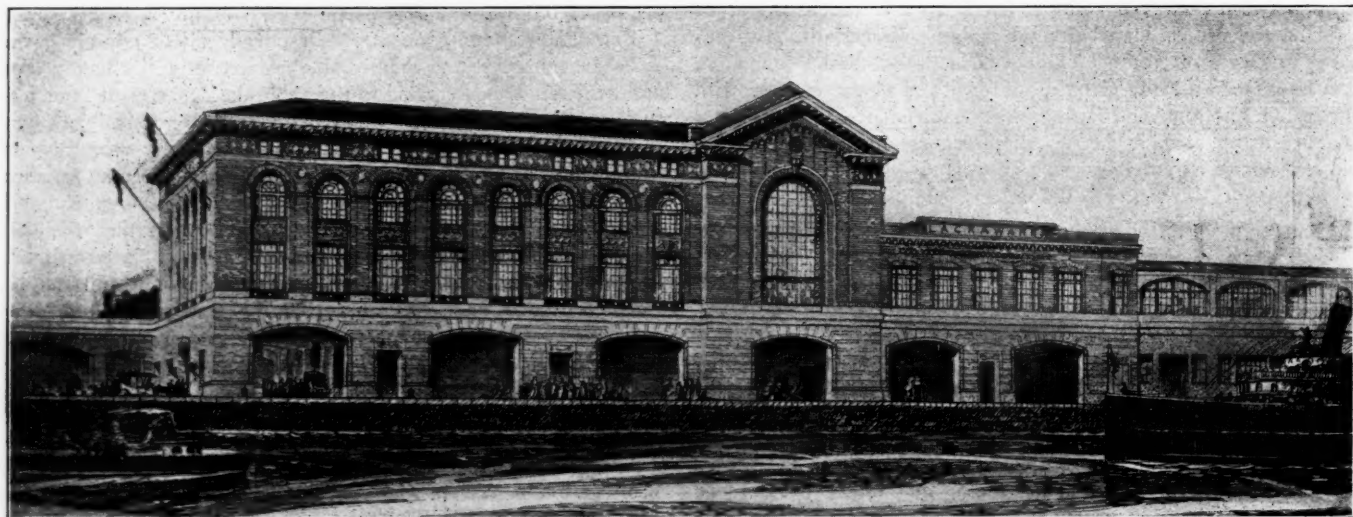
PASSENGER TERMINAL IMPROVEMENTS AT BUFFALO

The Delaware, Lackawanna & Western began construction work about the first of the year on its new passenger station and the rearrangement of its terminals in Buffalo, N. Y., in accordance with its agreement with the city's Terminal Station Commission. This commission was created by special act of the state legislature about four years ago, with power to negotiate with the railways entering the city to secure freight and passenger terminal improvements that have been desired both by the rail-

mediate relief for the passenger terminal situation was urgently needed.

There are at present four principal passenger stations at Buffalo; first: the so-called union station owned by the New York Central & Hudson River and used also by the Buffalo, Rochester & Pittsburgh; the Lake Shore & Michigan Southern; the Michigan Central; the Pennsylvania, and the West Shore; second: the Lehigh Valley station, used also by the Grand Trunk; third: the Erie station, used also by the New York, Chicago & St. Louis, and the Wabash; and fourth: the Delaware, Lackawanna & Western station. All of these stations are old and inadequate properly to handle the traffic. Also, in a number of instances the approaches cross streets at grade, endangering street traffic and causing delays in entering the station. Following extended negotiations with the Terminal Commission, the Lackawanna reached an agreement last year for the improvement of its entrance and the construction of a new station. The New York Central and the Lehigh Valley are still conducting negotiations for similar improvements and it is possible that in the rearrangement the roads now using the Erie station may become tenants of the New York Central. It has been tentatively decided to locate the New York Central station on the Terrace just west of the present union station near the location of a small station on the Niagara Falls branch of that road. It is expected that the Lehigh Valley will use its present entrance with some improvements in street crossings, but the location of its new station east and west has not yet been fixed.

The Lackawanna enters the downtown district of Buffalo from the southeast, approaching the Buffalo river near Michigan street and paralleling the river from that point to the passenger station and beyond to the coal docks. The double track line crosses Michigan street overhead and then drops down to the street level, the tracks being laid in Ohio street for the remaining distance to the station. The old passenger station is located on the west side of Main street with the lake freight house just across the tracks on the river front. The coal docks are located about one-half mile west of the station and the local freight house north of the main tracks near Columbia street. The advantages of this river front location for the freight traffic are evident, and as the passenger station is only a few blocks from



Perspective Sketch of Proposed D. L. & W. Passenger Station at Buffalo, N. Y., from the River Side

ways and the city. The membership of the commission, as fixed by the act of the legislature, consists of ten prominent citizens of Buffalo serving without pay, the commission having authority to act in this matter for the New York Public Service Commission. The constitutionality of the act was contested in the courts and was upheld by a decision rendered in March, 1913. The commission has done little toward the consideration of the problem of improving the city freight terminals, as some im-

the hotel and office district of the city and the other railway stations, its location was also satisfactory. The old building was entirely inadequate, however, having been remodeled from the structure used by the street railway company as a car barn in the days of horse car operation. It was also very desirable from the standpoint both of the railway and the city to remove the tracks from the public streets along the river front.

The traffic to be considered in designing the new passenger

station and terminal approaches consists of eight passenger trains each way per day, five of which in each direction are through trains to and from New York; a heavy movement of Pennsylvania coal, particularly in the summer, which is hauled to the coal dock for loading lake boats; and a considerable package freight traffic for transfer to and from lake steamers at the lake freight house, in addition to the local freight business handled at the separate house mentioned above. The passenger terminal is of the stub-end type, all through cars for western connections being handled at East Buffalo or other junction points east of the station. All locomotives and cars are handled at the East Buffalo terminal, about five miles from the station.

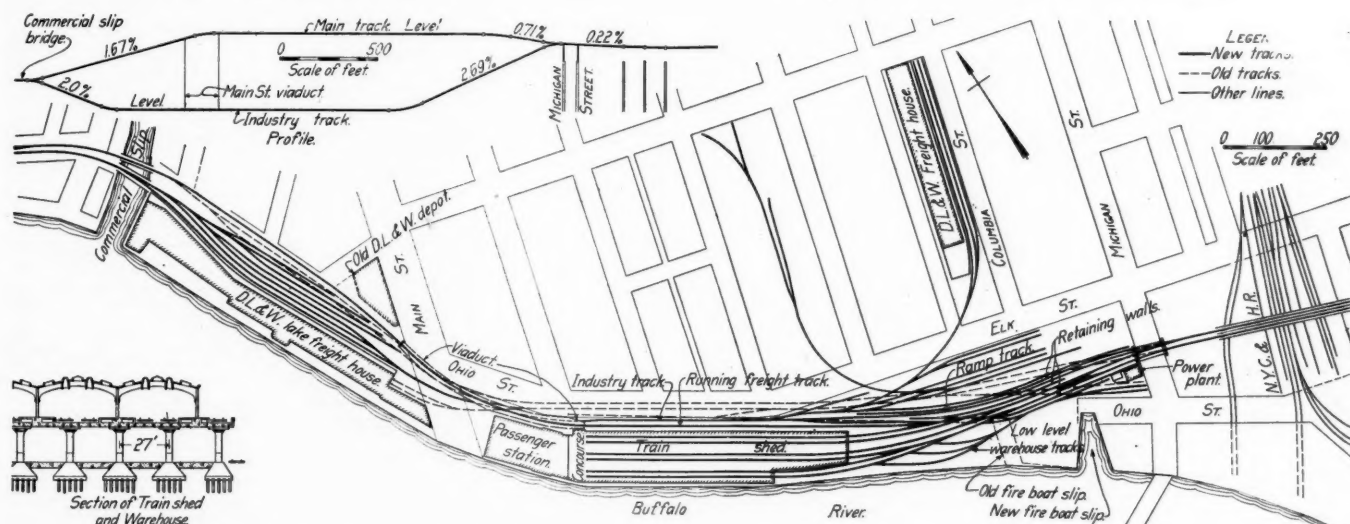
The new passenger station will be located just east of Main street adjacent to the river. By moving Ohio street about 40 ft. to the north and acquiring all property between Ohio street and the river this allows all tracks to be placed south of the street, leaving it unobstructed. The track level is raised about 22 ft. above the street and the single track lead to the coal dock is carried on this elevation across Main street on a steel viaduct encased in concrete. The only grade crossing involved in the new layout is the single track lead to the lake freight house just west of Main street. This lead is carried alongside the train shed and station building and under the Main street viaduct,

shed, will be available for future warehouse development. It will be necessary to construct a new fire boat slip in order to remove the old one which interfered with the location of the station leads.

The new station will be a steel frame structure, 110 ft. by 250 ft. in size, with a granite base course, brick facing above the waiting room floor level, and a tile roof. It will be four stories high with a mezzanine floor between the dock level and the train shed floor. The upper portion of the building will be devoted to offices. The new dock will have a concrete dock wall supported on timber piles, all of the timber construction being kept below the water line. About 10,700 piles are being driven under the station and train shed. About 30 ft. of quicksand has been encountered; under part of the work and under this condition the piles are jetted. Elsewhere they are driven. The piles are being driven to rock which is about 40 ft. below street grade.

An electro-pneumatic interlocking tower, controlling the entrance to the station, will be located on top of the power plant which will furnish heat to the new station. This is located just west of Michigan street, this somewhat remote location being chosen in order to leave the more valuable space along the river front free for development.

This improvement work is being carried out under the direc-



Track Plan Showing the Lackawanna Improvements along the River Front in Buffalo, N. Y.

connecting with the small yard adjacent to the freight house. The lead to the local freight house just west of Columbia street is unchanged, connecting with the low level tracks just north of the train shed. The two main tracks will remain unchanged across Michigan street, but just west of that point they will swing to the south diverging to six station tracks, two of which are about 475 ft. long and four 675 ft. long.

Advantage has been taken of the location of the station on the river front in a number of ways. Arrangements have been made to dock the passenger boats of the Detroit & Cleveland and the Cleveland & Buffalo boat lines alongside the station building and passengers of these steamers will use all of the station facilities in common with the railway company's patrons. A Bush type train shed will be used and the station tracks and platforms, as well as the shed, will be supported on a continuous deck structure of reinforced concrete, over the tops of the supporting columns, which will be spaced 27 ft. center to center in both directions. This type of construction will make available all of the space under the train shed for warehouse purposes. This storage space will be accessible to boats docking alongside and it can also be served by three spur tracks connecting by a switch-back, shown in the accompanying plan, under the station approach tracks to the low level track along the north side of the station. The new development will involve the construction of about 1,800 ft. of dock, a portion of which, just east of the train

tion of G. J. Ray, chief engineer, Delaware, Lackawanna & Western; A. E. Deal, bridge engineer; G. E. Boyd, division engineer, and O. H. Kellogg, assistant engineer. Kenneth M. Murchison, New York, is the architect for the station building. The contract for all foundation and dock work was let to the Buffalo Dredging Company, Buffalo, N. Y., and that for the station to the Hedden Construction Company, New York City.

SUMMARY OF RAILWAY PROGRESS IN CHILI.—The government of Chili now has under construction 208 miles of railroad estimated to cost about \$8,634,000, of which it is expected to complete 63 miles by the close of 1914 at a cost of \$1,848,000. On completion of these lines, the Chilean government will own and control 2,270 miles, of which 150 miles is double track. The private railroads of the country cover 1,860 miles with 878 miles under consideration. The 1,860 miles are valued at \$93,066,583, and the receipts for 1913 were \$14,460,425, with expenses at \$11,521,156, showing a net gain of \$6,051,378; while the state railways showed a loss of \$2,732,596. As has been noted before, the Chilean government is at present outlining a scheme of equipping the government railways with rolling stock sufficient in quantity to handle the growing business of the country, three-fourths of the total number of cars and locomotives required will have to be purchased abroad, and it is said that American material will have the preference at the same price.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION

The sixth annual convention of the American Railway Tool Foremen's Association was held at the Hotel Sherman, Chicago, July 20-22, inclusive. The meeting was called to order by A. M. Roberts of the Bessemer & Lake Erie, president of the association. After a prayer by the Rev. Howard A. Lepper, rector of Christ Church, Englewood, the association was welcomed by J. F. De Voy, assistant superintendent motive power and machinery, Chicago, Milwaukee & St. Paul. Mr. De Voy spoke very highly of the work done by mechanical department associations, stating that the members in attendance at the Atlantic City conventions this year seemed to pay more official attention to what the junior organizations were doing. Many of the superintendents of motive power in attendance when questioned stated that the time had come when the older associations were becoming more dependent on the junior associations for help in developing the mechanical departments of railways. Money spent by the railroads in sending men to conventions of this kind is not wasted in the least, and if the members will give up their ideas to their fellow workers the railroads will be greatly benefited.

Mr. De Voy paid special tribute to the integrity and sincerity of purpose of the men in the motive power department. Conventions of this sort will do a great deal to promote the general efficiency of that department. He referred to the tool foremen as efficiency engineers of the highest type and pointed out that their special field lay in establishing standards that would facilitate the work and reduce the cost of production, referring to the work that had been done in the automobile industry as an illuminating example.

A special field for the tool foremen is the devising of safety appliances to be placed on machines. By their ingenuity they can devise efficient and inexpensive safeguards that will be of vast benefit to the railroads they serve. He called on the tool foremen to shoulder part of the responsibility the state and federal laws have placed on the railroads and do all they can to perfect the safety appliances. Mr. De Voy closed his remarks with some very encouraging words as to the business conditions. Within the past month the Milwaukee has increased its force ten per cent. He laid particular stress on the benefits the railroads would derive from the abundance of grain that is being shipped.

PRESIDENT'S ADDRESS

President Roberts spoke of the opportunities the tool foremen have in increasing the efficiency of the mechanical department. The higher officers are looking to the tool foremen more and more each year, calling on their ingenuity and skill to increase the output of the shops and at the same time improve the quality of the work. A special field for the tool foremen is to standardize the tools so that a much less number will be required to perform the necessary work. Mr. Roberts also spoke of the benefit he has personally received by attending the conventions. Many new ideas obtained from other members through the discussions on the floor have been successfully applied by him.

STANDARDIZING REAMERS

Several members presented papers on standardizing reamers for locomotive repairs. C. A. Schaffer, general tool inspector, Illinois Central, spoke in part as follows: To any one who has had practical experience in a locomotive repair shop the economy resulting from standardized reamers is obvious, and to those who have gone into the matter systematically no argument is necessary to show wherein a saving may be effected. If conditions will not permit of going into the matter in a general way, possibly on account of not wishing to replace all of the large stock of tools of various descriptions at one time, it may be possible to select one or more sets from the following list of reamers to start with, any one of which when completed and put into practical use should show a good saving, as compared

with the old method: Crossheads and piston reamers; knuckle pin reamers; ball joint reamers; and rod and frame bolt reamers. A saving in time from one to eight or ten hours may be effected on jobs when compared with the old practice of putting the work into a machine and boring it for a fit. Then, too, the life of the job will be much greater if it is done with the proper tools.

The commercially manufactured locomotive tapered reamers, which are cataloged by all the leading small tool manufacturers, for use on rods and frame work, come far from being suitable for use on the heavy power of today. A revision in standards along this line would, no doubt, result in increased business for the manufacturer and economy for the roads who buy the greater proportion of such tools instead of making them themselves.

E. J. McKernan, Atchison, Topeka & Santa Fe, stated that on the Santa Fe lines all the frame reamers for locomotives have 1/16 in. taper in 12 in. All sizes of reamers 1 in. in diameter and under are purchased from manufacturers and all those over that are made in the tool room at Topeka. Nine reamers have been adopted as standard for crosshead and piston work. These reamers are tapered 1/2 in. in 12 in., and are made with a left hand spiral. Four reamers are used for the knuckle pin work on side rods. They have a 9-in. flute and a 1 1/2-in. taper in 12 in., with a left hand spiral of 68.57 pitch. A standard tapered reamer of a straight flute 12 in. long is used for the link blade pin. This one reamer takes care of all the jaws on Stephenson link motion as well. The standard reamers for cylinder saddle flange work are used in all holes on cylinder splices as well as on the flanges for truing up the holes after the cylinder has been bolted together. These reamers are tapered to 1/16 in. in 12 in. For general motion work two reamers are used, one 17 1/2 in., and the other 19 1/2 in. over-all. They have a taper of 1/2 in. in 10 in., measure 1 1/4 in. on the point and have a left hand spiral. The dimensions of reamers in use on the Philadelphia & Reading, Southern and the Chicago, Rock Island & Pacific were submitted by J. P. Manger, J. E. Dossier and W. J. Eddy, respectively.

Discussion.—From the discussion it was clearly brought out that the square shank was more desirable than the tapered shank for all reamers. These square shanks should be made in four different sizes so that it will not be necessary to have too many wrenches with which to drive them. The high point of the discussion was, however, the success with which the spiral reamer had met wherever it had been used and carefully made. Some reported that it was impossible to use carbon steel reamers and that high speed steel was necessary. Other roads, however, reported that with the fluted reamers carbon steel could be used exactly as well and that there was very little difference in the life. The process of the manufacture of the spiral reamer is a little more difficult than the straight reamer, although devices have been used whereby the machine work is pretty nearly the same. It is more difficult, however, in tempering and grinding as the reamers are more liable to become warped.

The Atlantic Coast Line makes reamers so that they may be ground four times, each time taking off 1/32 in. in diameter. When they have been used up to this limit they are reclaimed by being made into smaller reamers, or small tools. The discussion was closed with a recommendation that the secretary be instructed to gather information from the members of the association concerning the sizes and the degree of taper, together with other information, with a view of establishing standards for reamers at the next convention.

The remaining sessions of the convention will be reported in next week's issue.

ROLLING STOCK ON A CHINESE RAILWAY.—At the end of 1913 the rolling stock of Tientsin-Pukow Railway of China consisted of 32 locomotives; 66 passenger and inspection cars and 490 freight cars. The freight and passenger receipts for the year were \$900,600.

THE RAILROADS' MOST GIGANTIC TASK

By JOHN FINDLEY WALLACE

[From Leslie's Illustrated Weekly Newspaper, July 16, 1914]

Chicago, which conquers in the sign "we will," now contemplates picking up a river which is in her way and carrying it out west where she wants it; not very far west—only a few city blocks—but the job will cost about \$6,000,000, and that is only one item in the complicated and costly undertaking by which 1-764 of the city's area, where more than twenty railroads handle every day 112,000 tons of freight and 200,000 passengers, must be unmanacled from congestion.

At New York the national government, the city and state of New Jersey are endeavoring to work out colossal projects for handling the natural growth of freight at a port doing an annual business of more than \$2,000,000,000, plus that which is expected from the three great new ditches, the New York state barge canal, the Cape Cod and Panama canals. For the railroads this situation presents expensive problems. On the west side of Manhattan there is great congestion of incoming food, raw materials and manufactures and outgoing factory products and distributors' merchandise. Yards are to be constructed between Sixtieth and Seventy-second streets taking some of the costliest land in the world; it is desired to have surface operation below Sixtieth street eliminated by boring a subway to the Battery which will serve business on the land side, connect with the New Jersey ferries and link up the steamship piers with the island and with one another. Freight tunnels under the Hudson are contemplated to the New Jersey terminals. Dock development in Brooklyn with a marginal railway adjacent thereto will call for further expenditures by the rail lines for effective and convenient connections.

Boston lies between roads south and roads north, subjecting business to a high cartage cost and demanding some form of belt line, probably involving a tunnel from South Boston to East Boston under the harbor, to say nothing of electrification for both passenger and freight service.

Philadelphia must rearrange and electrify her passenger terminals so as to care for an immense number of commuters directly on the line of a very extensive through service to the south and west; while our old friend, the cartage charge, demands that freight consumed and disgorged by 8,000 or 9,000 manufacturing establishments be laid down and taken up more nearly at every man's door—and every man's door is located where it is going to cost money to plow a railroad track through to it.

Baltimore is opening an entire new section to the southeast by means of the so-called "Key Highway" with a network of tracks connecting manufacturing and jobbing sites with the railroads and piers; and the Calvert freight houses and yard spaces are to be doubled in capacity.

At Buffalo a state commission has been working out for two years the disentanglement of the Buffalo situation, which has been tying itself up tighter and tighter. Fast through passenger trains roll as serenely past this lakeport of nearly half a million people as if it were a country village; there is no quick way of getting a train in and out again. A score of railways are scattered here, there and everywhere over the city with their unrelated passenger and freight facilities which must be systematized. The New York Central alone must spend \$9,000,000 for a passenger and freight terminal recently sanctioned by the commission.

St. Louis is served by ten eastern lines whose rails terminate at East St. Louis on the Illinois side of the river and by seven lines running into the city. The intermediate service is performed by practically one switching line over the two bridges except a small portion which is ferried. This arrangement requires extensive terminal accommodations. On the St. Louis side the situation is serious. Additional team track service and freight house facilities can be provided upon land already acquired for that purpose, if an ordinance can be agreed upon with the city authorities. Cleveland, Columbus and Cincinnati

have all outgrown their facilities. The list might be prolonged.

Terminal betterments are made in order to reduce the time that freight cars and packages are in the hands of the railroads and not traveling. L. F. Loree some months ago told the story of a freight car trip. The car was in the hands of the railroads 63.7 per cent. of the time and in the hands of the shippers 36.3 per cent. of the time. On the average, shifting and interchange movements consume 10.1 hours out of 24, or two-thirds of the time that the car is in the possession of the railroads. "Here," says Mr. Loree, "center the largest opportunities of reducing the delays that are wasteful of time and money alike."

Each of the great cities is beset by the gravest anxiety, because its people know history. They have read the legend, which scientific excavators credit, that a cat could walk from wall to wall and house-top to house-top through the Syr-Darian river valley from Kashgar in Eastern Turkestan to the Sea of Aral; that the remains of ancient Bactra (Balkh) cover a circuit of twenty miles after 600 years of abandonment, and that Jenghiz Khan is said to have slain 800,000 people in Bagdad alone. Life was fine and fair in Bagdad and in many a metropolis of old created at the convergence of camel routes between Europe and China and India. When shipbuilders began to use iron nails instead of wooden pegs and to navigate the Red sea with loss from shipwreck so diminished that freight rates were lower by ship than by caravan, the inland center with a population running into the millions could shrivel and evaporate, and become the tomb of busy commerce, muck for the antiquarian's rake.

Through routes today in the United States are assailed by competition on every hand. Freight shipped at New York, jobbed at Chicago and rejobbed at Spokane can go, if induced, by way of Tehuantepec or Panama; San Francisco or Seattle will do the jobbing. If transshipment at Chicago came to involve sufficient delay, freight from New York might even travel coastwise to Newport News or Baltimore and beat the Chicago route into Spokane in point of time as well as of cost. This is especially true when industry is booming, terminal facilities strained and everyone eager to cash in while the going is good. One such period might almost create a new major center of transshipment for the country. Men in middle life can remember when St. Louis ridiculed the prediction that Chicago would outstrip her in business and in population. There is another kind of competition. If merchandise manufactured on the Atlantic seaboard is delayed long enough in going through inland terminal cities on its way across the Mississippi, manufacturing plants will be established at points from which product can be laid down in the trans-Mississippi territory without going through those centers of transshipment.

It is not only the residents of terminal cities who suffer if transportation through those cities is defective. The point at which the shipper comes in contact with a terminal defect may be a thousand miles away from the defective terminal. He wants a car which he cannot get or he is waiting for a load that does not come. He thinks and says that he is suffering from a car shortage. The fact may be that too many cars have clogged a terminal somewhere. The real shortage is a terminal shortage.

To some extent his sufferings may be ameliorated by the addition of more rolling stock and to a large extent in the recent past the railways, turning in the direction of least resistance, have increased their rolling stock as a stop gap while postponing the city terminal improvements which involve such enormous land costs.

More cars under some circumstances will enable the shipper to start his shipment sooner, but delivery will be no more prompt if a clogged terminal stands in the way. Ultimately what interests the shipper is the time consumed from the moment when his shipment is ready to load to the moment of delivery to the consignee.

A group of railroads in reply to an inquiry have furnished a detailed computation showing that they would spend in terminal development in the next five years if they could obtain the necessary capital an average of \$3,312 per mile of track. At this rate the total for all roads would be \$1,316,924,064. To borrow

this sum at 5 per cent. would impose an annual interest charge of \$65,846,203. In 1911, the latest year for which statistics are complete, the roads had available for resuming or increasing dividends but used instead for improvements or surplus \$161,825,740. Taking from this amount the interest on the investment estimated as desirable for terminals, \$65,846,203, and another interest charge of \$19,635,000, estimated for substituting steel cars for wooden, and the roads would have had available in 1911 for improvements and surplus \$76,344,537—an amount which would be completely wiped out merely by an average advance of 7 per cent. in the compensation of railway employees. There is also to be provided a huge additional sum annually, of which well-based estimates are practically impossible, for safety appliances on cars and locomotives, for block signals, for automatic train-stops, and for the elimination of grade crossings, none of which enlarge earning power.

The United States must choose. Either we must give up in some degree our pre-eminence as having by far the lowest railway capitalization in the world, and permit our lines to earn such revenues as will attract enormous investment for terminal and other improvements; or we must on the other hand renounce the American rapidity of national development and content ourselves with the slow growth which is typical of older countries.

ACCIDENT BULLETIN No. 50

The Interstate Commerce Commission has issued quarterly Accident Bulletin No. 50 containing the record of railway accidents in the United States during October, November and December, 1913. The number of persons killed in train accidents was 191 and of injured 3,726.

The total number of casualties of all classes reported, including industrial accidents, was 2,792 killed and 50,776 injured. The accidents are summarized as follows:

TABLE No. 1.—Casualties to persons—Steam railways

Causes	Passengers		Employees (including not on duty)		Other persons (trespassers and non-trespassers)		Total persons	
	Killed	Inj'd	Killed	Inj'd	Killed	Inj'd	Killed	Inj'd
Train accidents.								
Collisions	3	1,004	77	734	9	42	89	1,780
Deraillments	31	1,198	55	520	9	34	95	1,752
Miscellaneous, including boiler explosions .....	..	7	6	183	1	4	7	194
Total	34	2,209	138	1,437	19	80	191	3,726
Other than train accidents.								
Accidents (113) to road-way or bridges not causing derailment..	..	..	..	..	3	..	3	..
Other accidents (classes C3 to C12, inclusive)	51	1,927	688	13,139	1,742	2,977	2,481	18,043
Total	85	4,136	826	14,576	1,764	3,057	2,675	21,769
Industrial accidents to employees.								
While working on tracks or bridges..	..	..	40	6,470	..	..	40	6,470
At stations, freight houses, enginehouses, etc. ....	..	..	24	6,678	..	..	24	6,678
In and around shops. ....	..	..	31	13,989	..	..	31	13,989
On boats and wharves ..	..	..	7	508	..	..	7	508
At other places.....	..	..	15	1,362	..	..	15	1,362
Total .....	..	..	117	29,007	..	..	117	29,007
Grand total.....	85	4,136	943	43,583	1,764	3,057	2,792	50,776

Table No. 1A, following, presents comparisons with the record in the bulletin next preceding and the bulletin covering the corresponding quarter of the previous year.*

TABLE No. 1A.—Condensed summary of fatalities.

No.	Item	Bulletin No. 50	Bulletin No. 49	Bulletin No. 46
1	Passengers killed in train accidents.....	34	33	57
2	Passengers killed, all causes.....	85	96	114
3	Employees (on duty) killed in train accidents..	137	141	170
4	Employees (on duty) killed in coupling.....	49	42	54
5	Employees (on duty) killed, total.....	730	759	861
6	Total passengers and employees (items 2 and 5, above)	815	855	975

*Preceding bulletins have been noticed in the *Railway Age Gazette* as follows: No. 49, May 15, 1914, page 1072; No. 48, March 6, 1914, page 468; No. 47, October 24, 1913, page 759; No. 46, August 29, 1913, page 383.

7 Other persons killed (including trespassers, nontrespassers and employees not on duty), all causes	1,860	2,186	1,886
8 Employees killed in industrial accidents.....	117	132	106
Grand total (items 6, 7 and 8).....	2,792	3,173	2,967

The total number of collisions and derailments reported was 3,757 (1,450 collisions and 2,307 derailments), of which 182 collisions and 217 derailments affected passenger trains. These are classified as follows:

TABLE No. 2.—Collisions and derailments

No.	Classes	Number	Killed	Inj'd	Damage to road and equipment
Collisions—					
1	Rear	250	22	477	\$311,063
2	Butting	141	37	644	307,444
3	Train separating	98	2	26	35,401
4	Miscellaneous	961	28	633	556,482
Total		1,450	89	1,780	\$1,210,390
Derailments due to—					
5	Defects of roadway	576	25	855	\$433,395
6	Defects of equipment	1,091	4	236	840,948
7	Negligence	126	3	83	97,774
8	Unforeseen obstruction	76	14	108	73,670
9	Malicious obstruction	16	5	54	31,661
10	Miscellaneous	422	44	416	402,522
Total		2,307	95	1,752	\$1,879,970
Total collisions and derailments.		3,757	184	3,532	\$3,090,360
Total for same quarter of—					
1912		3,994	227	4,010	\$3,408,953
1911		3,346	230	4,132	2,893,948
1910		3,366	219	3,175	2,831,469

The usual tables are given classifying certain kinds of accidents in detail.

Thirteen accidents occurring during this quarter were investigated by the inspectors of the commission and the reports of these investigations fill 27 pages of the bulletin. The accidents occurred as follows:

Southern	Oyama, N. C.....	Mar. 31, Derailment
St. Louis Southwestern.....	Stephens, Ark.	Oct. 2, Butting collision
N. Y., Chic. & St. Louis....	Fairview, Pa.	Oct. 3, Butting collision
Mobile & Ohio.....	Buckatunna, Miss....	Oct. 19, Derailment
Pennsylvania	Portville, N. Y.	Oct. 20, Side collision
Southern	Easley, S. C.	Oct. 27, Derailment
St. Louis & S. F.	Chelsea, Okla.	Oct. 29, Derailment
Phil., Balt. & Washington..	Washington, D. C.	Oct. 31, Derailment
Great Northern	Rexford, Mont.	Oct. 31, Butting collision
Lake Shore & Mich. So....	Mount Union, Ohio..	Nov. 6, Butting collision
Central of Georgia.....	Clayton, Ala.	Nov. 13, Derailment
Central Vermont	Georgia, Vt.	Nov. 16, Butting collision
Virginian	Keever, Va.	Nov. 29, Butting collision

Electric Railways reporting to the commission (not included in the foregoing statistics) had 124 persons killed during the quarter and 1,445 injured; and there were 57 collisions and 15 derailments. Train accidents are charged with seven fatalities. The total number of passengers killed from all causes was 9 and of employees 25 (13 in industrial accidents). The number of trespassers struck or run over by cars was 65; 37 killed and 28 injured.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE

The tables on the two pages immediately following show the number of freight cars in service on all of the important railroads of the country in 1912 and 1913, and in 1900 and 1913. It will be noted that narrow-gage cars are excluded, as well as non-revenue cars, but that cars used to carry company freight are included. The railways are grouped under the heads of New England roads, trunk line roads, Southern classification roads, Central classification roads and Western classification roads.

The tables show the number of cars in service, the number of cars per mile of road, average length of haul, freight cars per thousand freight car miles and per thousand ton miles, the average rate per ton per mile, and the freight cars in service per thousand dollars of freight earnings.

The table does not show the capacity of cars and, of course, roads which show a decrease in the number of cars may have cars with a larger total capacity despite the smaller number.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1912 AND 1913.

Miles.	Frt. equip.		In-crease.	De-crease.	Per cent. of change.	Frt. cars per mile of road.	Average length of haul.		Per 1,000 rev. ton miles.		Rate per ton mile. (Dollars).		Freight cars per \$1,000 frt. earnings.	
	1912.	1913.					1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.
NEW ENGLAND RAILROADS:														
Boston & Maine.....	2,291	2,302	25,410	1,155	4.94	11.1	10.5	103.86	.115	.106	.01089	.01054	0.95	0.84
Bangor & Aroostook.....	625	568	3,335	3,279	1.05	8.6	9.3	125.31	.272	.296	.01121	.01146	2.31	2.15
Central Vermont.....	536	536	3,451	3,310	4.09	6.4	6.2	76.73	.110	.112	.00930	.00930	1.20	1.12
Maine Central.....	1,192	1,205	9,110	9,347	2.60	7.6	7.7	90.16	.163	.160	.01086	.01086	1.37	1.31
New York, New Haven & Hartford..	2,992	2,114	38,053	38,276	1.868	4.91	18.2	94.95	.178	.163	.01371	.01371	1.18	1.06
Total.....	6,736	6,725	81,359	78,275	3.083	3.79	12.1	98.24	.168	.167	.01120	.01112	1.36	1.29
TRUNK LINE RAILROADS:														
Baltimore & Ohio.....	4,455	4,456	87,002	88,619	1.617	19.5	19.9	193.04	.106	.103	.00580	.00560	1.20	1.10
Buffalo, Rochester & Pittsburgh.....	570	576	16,625	17,181	3.34	29.2	29.8	159.30	.191	.179	.00480	.00461	2.03	1.83
Central of New Jersey.....	669	676	22,015	23,912	8.62	32.9	35.4	72.56	.168	.162	.00861	.00882	1.16	1.09
Chesapeake & Ohio.....	2,263	2,319	43,740	43,740	2.39	19.3	18.4	256.00	.125	.123	.01043	.01043	1.60	1.55
Delaware, Lackawanna & Western...	878	904	19,712	19,028	684	3.47	22.4	144.11	.121	.109	.00660	.00663	1.05	0.94
DelaWare, Lackawanna & Western...	985	985	28,720	28,384	336	1.17	29.2	170.50	.112	.105	.00726	.00731	1.05	0.96
Erie.....	2,258	2,258	49,465	49,119	346	0.70	21.9	184.61	.104	.101	.00772	.00774	1.24	1.11
Lehigh Valley.....	1,441	1,451	43,352	43,409	7	30.1	29.9	160.42	.126	.126	.00646	.00646	1.40	1.18
New York Central & Hudson River..	3,791	3,753	71,693	78,748	7,055	9.84	18.9	194.62	.084	.085	.00661	.00661	1.10	1.14
New York, Ontario & Western.....	566	566	6,409	6,568	159	0.92	11.3	145.29	.110	.106	.00758	.00758	0.98	0.90
Pennsylvania Railroad.....	4,092	4,111	139,346	148,073	8,727	6.26	34.1	153.42	.123	.115	.00583	.00583	1.08	1.09
Reading.....	1,015	1,020	40,210	42,651	2,441	6.07	39.6	93.82	.135	.132	.00704	.00704	1.13	1.04
Western Maryland.....	543	543	6,635	7,944	1,309	1.97	12.2	94.55	.116	.135	.00596	.00579	1.11	1.27
Total.....	23,526	23,618	574,924	596,327	21,403	3.73	24.4	155.43	.125	.122	.00677	.00629	1.24	1.17
SOUTHERN CLASSIFICATION:														
Atlantic Coast Line.....	4,568	4,617	27,233	28,920	1,687	6.19	5.9	153.60	.131	.131	.01230	.01203	1.21	1.18
Central of Georgia.....	1,915	1,924	10,302	10,112	190	1.84	5.4	147.70	.135	.132	.01120	.01049	1.16	1.15
Florida East Coast.....	642	642	1,267	1,370	103	8.13	2.0	162.89	.057	.049	.01712	.01712	0.60	0.54
Louisville & Nashville.....	4,740	4,923	44,727	45,269	542	1.21	9.4	220.00	.116	.116	.00886	.00886	1.10	1.05
Mobile & Ohio.....	1,114	1,119	10,305	10,606	301	2.92	9.2	173.00	.097	.094	.00750	.00750	1.13	1.04
Nashville, Chattanooga & St. Louis...	1,230	1,231	9,943	10,078	135	1.36	8.1	146.00	.124	.121	.01030	.00995	1.18	1.08
Norfolk & Western.....	2,018	2,035	42,065	42,699	634	1.51	20.8	273.74	.096	.092	.00424	.00424	1.22	1.12
Norfolk Southern.....	608	569	3,019	2,896	123	4.07	5.0	80.81	.249	.225	.0226	.0226	1.38	1.28
Seaboard Air Line.....	3,059	3,074	15,846	16,845	999	6.25	5.2	147.87	.115	.111	.01010	.01091	1.03	1.00
Southern Railway.....	7,088	7,036	50,919	48,746	2,173	4.27	7.2	154.58	.127	.117	.00987	.00982	1.23	1.08
Virginian Railway.....	475	503	6,374	7,023	649	10.18	13.4	347.63	.121	.107	.00351	.00343	1.44	1.31
Total.....	27,457	27,673	222,000	224,564	2,564	1.15	8.5	182.59	.124	.117	.00997	.00983	1.15	1.08
CENTRAL CLASSIFICATION:														
Chicago, Indianapolis & Louisville...	617	617	6,769	6,922	153	2.26	11.0	133.60	.178	.162	.00826	.00745	1.59	1.48
Cincinnati, Hamilton & Dayton.....	1,015	1,015	11,281	9,602	1,679	14.88	11.1	122.63	.143	.130	.00836	.00826	1.57	1.30
C. C. & St. Louis.....	2,012	2,014	24,490	24,224	266	1.08	12.1	152.30	.087	.083	.00530	.00547	1.10	1.07
Grand Rapids & Indiana.....	578	576	3,207	3,207	...	0.00	5.6	96.73	.099	.098	.00633	.00707	0.98	0.98
Lake Erie & Western.....	906	906	3,150	2,796	354	11.24	3.5	123.98	.061	.052	.00462	.00656	0.68	0.59
Lake Shore & Michigan Southern...	1,872	1,853	54,861	57,693	2,832	5.16	29.3	159.50	.123	.119	.00726	.00726	1.51	1.50
Michigan Central.....	1,817	1,800	26,227	25,681	546	2.08	14.4	145.00	.087	.078	.00664	.00652	1.23	1.11
New York, Chicago & St. Louis.....	523	523	12,622	11,957	665	5.11	24.1	196.00	.082	.078	.00664	.00652	1.23	1.16
Pennsylvania Company.....	1,751	1,750	59,328	62,073	2,745	4.63	33.9	79.85	.137	.138	.00668	.00668	1.25	1.25
P. C. & St. Louis.....	1,472	1,472	27,596	30,210	2,614	9.47	18.7	125.82	.107	.088	.00580	.00569	0.89	0.99
Pere Marquette.....	2,330	2,330	17,943	17,727	216	1.20	7.7	167.86	.132	.125	.00643	.00603	1.59	1.48
Vandalia.....	827	876	8,832	8,821	11	0.12	10.7	107.40	.118	.108	.00648	.00638	1.22	1.14
Total.....	15,720	15,732	256,306	260,913	4,607	1.79	16.3	134.22	.112	.106	.00617	.00610	1.24	1.17
WESTERN CLASSIFICATION:														
Atchafalpa, Topeka & Santa Fe.....	10,733	10,771	62,241	66,213	3,972	6.38	5.8	329.59	.092	.094	.01026	.01002	0.87	0.85
Chicago & Alton.....	1,026	1,026	11,756	11,667	89	0.77	11.5	152.72	.109	.099	.00576	.00537	1.26	1.18
Chicago & Eastern Illinois.....	12,075	12,075	23,516	26,210	694	2.72	20.0	146.21	.200	.202	.00530	.00530	2.29	2.19
Chicago & North Western.....	7,960	7,976	59,098	60,429	1,331	0.25	7.4	138.11	.194	.177	.00910	.00870	1.27	1.11
Chicago, Burlington & Quincy.....	9,074	9,129	55,726	55,735	9	0.02	5.1	254.92	.102	.085	.00752	.00729	0.97	0.87
*Chicago, Great Western.....	1,496	1,496	11,294	10,891	403	3.57	7.5	222.66	.115	.107	.00732	.00725	1.07	1.11
*Chicago, Milwaukee & St. Paul.....	7,296	7,296	43,778	62,216	16,438	35.91	6.3	246.23	.096	.090	.00732	.00732	1.07	1.11
Chicago, Milwaukee & Puget Sound...	2,059	2,059	11,959	11,959	11,959	100.00	5.8	542.51	.109	.097	.00883	.00883	0.92	0.92
Chicago, Rock Island & Pacific.....	8,036	8,048	41,798	44,064	2,266	5.42	5.2	215.69	.098	.097	.00890	.00890	1.01	0.95
Chicago, St. Paul, Minn. & Omaha...	1,745	1,747	11,438	12,569	1,131	9.89	6.6	157.23	.185	.189	.00868	.00860	1.21	1.16
Colorado & Southern.....	1,813	1,871	10,869	10,714	155	1.43	6.0	148.02	.145	.132	.00931	.00931	1.10	0.99
Denver & Rio Grande.....	2,551	2,555	14,578	18,370	3,792	26.01	5.7	116.44	.132	.170	.01210	.01194	0.84	1.02
Duluth, S. S. & Atlantic.....	623	628	2,923	3,309	386	13.20	4.7	67.47	.168	.184	.00895	.00865	1.42	1.47
Great Northern.....	7,482	7,500	5,954	5,954	5,954	12.50	6.4	226.11	.121	.114	.00768	.00768	0.99	0.92
Illinois Central.....	4,763	4,763	55,108	56,326	5,954	2.21	11.6	235.79	.113	.104	.00758	.00757	1.45	1.32
Kansas City Southern.....	827	827	5,847	5,847	368	3.07	6.6	227.01	.109	.089	.00758	.00758	1.45	1.32
Kansas City Southern.....	1,586	1,586	7,596	7,396	200	2.63	4.8	156.70	.131	.115	.00758	.00758	1.45	1.32
Minneapolis & St. Louis.....	3,773	3,773	22,586	25,064	2,478	10.97	6.0	225.39	.112	.112	.00758	.00758	1.45	1.32
Minn. St. Paul & Sault Ste. Marie...	7,231	7,257	43,343	42,773	570	1.32	6.0	218.00	.118	.103	.00758	.00758	1.45	1.32
Missouri Pacific.....	3,398	3,677	24,804	23,600	846	3.41	7.3	292.10	.135	.132	.00758	.00758	1.45	1.32
Missouri, Kansas & Texas.....	6,025	6,230	43,220	46,988	3,768	8.72	7.2	289.40	.126	.110	.00758	.00758	1.45	1.32
Northern Pacific.....	5,241	5,255	29,646	32,071	2,425	8.18	5.7	253.62	.152	.145	.00758	.00758	1.45	1.32
St. Louis & San Francisco.....	1,548	1,609	11,512	11,430	82	0.71	7.4	245.22	.152	.149	.01010	.01000	1.08	1.03
St. Louis Southwestern.....	724	724	1,850	2,745	895	48.38	2.6	151.00	.094	.094	.01010	.01010	1.08	1.03
San Antonio & Anansas Pass.....	9,970	10,311	47,448	50,049	2,601	5.48	4.8	228.03	.109	.109	.01010	.01010	1.08	1.03
Southern Pacific.....	1,885	1,885	11,096	11,201	105	0.94	5.9	183.00	.109	.109	.01010	.01010	1.08	1.03
Texas Pacific.....	7,150	7,349	29,255	30,682	1,427	4.88	4.1	381.80	.067	.062	.00867	.00867	0.96	0.96
Union Pacific.....	2,515	2,515	20,350	23,127	2,777	13.64	8.1	210.58	.109	.083	.00857	.00857	1.07	1.07
Wabash.....	119,805	121,849	765,908	807,331	41,423	5.41	6.4	214.53	.120	.119	.00857	.00857	1.10	1.06
Total.....	193,244	195,597	1,900,497	1,967,411										

*1913 operations of Chicago, Milwaukee & St. Paul R. R. Co. included in Chicago, Milwaukee & Puget Sound Ry. Co. included in Chicago, Milwaukee & St. Paul R. R. Co.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1900 AND 1913.

Note.—Narrow gauge cars excluded.
Non-revenue cars excluded.
Company freight included.

	Miles.		Frt. equipment.		In-crease.	Per cent. of road.		Average length of haul.	Freight Cars per 1,000 rev. ton miles.		Rate per ton mile. (Dollars)		Freight cars per \$1,000 frt. earnings.				
	1900.	1913.	1900.	1913.		1900.	1913.		1900.	1913.	1900.	1913.	1900.	1913.			
NEW ENGLAND RAILROADS:																	
Boston & Maine.....	1,787	2,302	12,230	24,155	.....	97.50	10.5	66.99	106.82	1.26	1.06	.0140	.01054	1.02	0.84	
Bangor & Aroostook.....	354	568	3,091	3,279	.....	70.78	8.7	89.62	132.05	.....	.296	.0359	.0347	3.79	2.15	
Central Vermont.....	513	536	2,006	3,310	64.95	3.9	94.97	73.96	.063	.112	.0079	.0104	.00880	.00930	0.90	1.12
Maine Central.....	816	1,205	3,586	9,347	.....	160.65	4.4	7.7	81.11	163	.163	.0123	.01086	1.09	1.31	
New York, New Haven & Hartford.....	2,008	2,114	13,116	36,185	.....	175.88	6.5	85.36	96.43	.076	.163	.0097	.01345	0.67	1.06	
Total.....	5,478	6,725	34,029	78,276	.....	130.03	6.5	83.61	99.88	.107	.167	.01264	.01112	1.49	1.29	
TRUNK LINE RAILROADS:																	
Baltimore & Ohio.....	3,179	4,456	61,708	88,619	26,911	43.61	19.3	194.81	197.53	1.28	1.03	.0068	.0062	1.96	1.10		
Buffalo, Rochester & Pittsburgh.....	472	576	18,858	17,181	8,323	93.96	18.7	29.8	136.16	139	.179	.0087	.00461	1.99	1.83		
Central of New Jersey.....	639	676	15,002	23,912	8,910	59.59	23.4	35.4	77.88	153	.153	.0118	.00882	1.36	1.09		
Chesapeake & Ohio.....	1,476	2,319	17,270	24,621	25,421	147.19	21.6	18.4	302.00	.082	.123	.0058	.00412	1.71	1.55		
Delaware, Lackawanna & Western.....	665	904	13,030	19,028	5,998	46.03	19.6	21.0	146.80	147	.109	.0058	.00663	1.54	0.94		
Erie.....	947	985	27,287	28,394	1,097	4.02	28.8	28.8	151.00	105	.105	.0144	.0070	1.79	0.96		
Lehigh Valley.....	2,104	2,258	46,225	49,119	2,894	6.26	21.9	21.7	194.40	188.61	1.01	.0089	.00574	1.60	1.11		
New York Central & Hudson River.....	1,382	1,451	34,954	43,409	8,455	24.19	25.3	29.9	188.08	135	.085	.0106	.00542	1.97	1.18		
New York, Ontario & Western.....	2,817	3,753	59,180	78,748	19,568	33.06	21.1	21.0	163.00	198.39	1.44	.0121	.00609	1.72	1.14		
Pennsylvania Railroad.....	480	566	5,899	6,568	669	11.34	12.3	11.6	142.38	144	.106	.0121	.00783	1.25	1.09		
New York, Ontario & Western.....	3,716	4,111	80,385	148,073	67,688	84.20	21.6	36.0	109.54	115	.115	.0067	.00583	1.45	1.09		
Reading.....	1,000	1,020	31,824	42,651	10,827	104.63	31.8	48.2	89.42	139	.132	.00831	.00734	1.50	1.04		
Western Maryland.....	279	543	691	7,944	7,253	104.63	2.5	14.6	51.02	135	.038	.0073	.00579	0.53	1.27		
Total.....	19,176	23,618	402,313	596,327	194,014	48.22	21.0	25.2	153.16	.098	.122	.00637	.00629	1.55	1.17		
SOUTHERN CLASSIFICATION:																	
Atlantic Coast Line.....	1,759	4,617	5,378	28,920	23,542	437.74	3.6	6.3	121.90	156.27	1.31	.0143	.01203	1.02	1.18		
Central of Georgia.....	1,196	1,924	5,041	10,112	5,071	100.59	4.2	5.1	148.86	146.97	1.07	.132	.01096	1.26	1.15		
Florida East Coast.....	642	1,370	1,370	1,370	.....	.....	.....	.....	.....	.....	.....	.....	.0172	.....	.....	.....
Louisville & Nashville.....	3,007	4,923	23,402	45,269	21,867	93.44	7.7	9.2	163.00	171.00	.096	.049	.00758	.00779	1.13	0.54	
Mobile & Ohio.....	876	1,119	5,389	10,606	5,217	86.81	6.2	9.5	195.63	230.10	.092	.096	.00590	.00656	1.33	1.04	
Nashville, Chattanooga & St. Louis.....	1,189	1,231	5,328	10,078	4,750	98.15	4.4	8.2	151.00	150.00	.113	.094	.00590	.00995	1.10	1.08	
Norfolk & Western.....	1,551	2,035	18,656	42,699	24,403	128.87	12.0	21.0	253.41	270.81	.085	.092	.00430	.00424	1.58	1.12	
Norfolk Southern.....	1,47	569	4,09	2,896	2,487	608.07	2.8	5.1	87.50	87.50	.225	.0161	.01770	.01584	0.91	1.28	
Seaboard Air Line.....	2,604	3,074	8,335	16,845	8,510	102.09	3.2	5.5	153.32	147.80	1.11	.111	.01180	.01091	1.14	1.00	
Southern Railway.....	6,306	7,036	26,814	48,746	21,932	81.79	4.2	6.9	168.82	155.43	1.07	.117	.00916	.00982	1.27	1.08	
Virginian Railway.....	503	703	7,023	12,564	7,023	127.40	5.3	8.1	157.04	184.64	1.05	.....	.00343	.00343	1.31	1.08
Total.....	18,635	27,673	98,752	224,564	125,812	27.24	9.9	11.2	153.00	138.29	1.55	.162	.00757	.00745	1.86	1.48	
CENTRAL CLASSIFICATION:																	
Chicago, Indianapolis & Louisville.....	546	617	5,440	6,922	1,482	27.24	9.9	11.2	153.00	138.29	1.55	.162	.00757	.00745	1.86	1.48	
Cincinnati, Hamilton & Dayton.....	652	1,015	7,838	9,602	1,764	22.51	12.0	9.5	108.96	121.31	1.30	.130	.00529	.00529	2.00	1.30	
C. C. & St. Louis.....	1,891	2,014	15,484	24,224	8,740	56.40	8.2	12.0	169.30	154.50	.094	.083	.00583	.00547	1.42	1.07	
Grand Rapids & Indiana.....	582	576	3,015	3,207	192	6.37	5.2	5.6	90.12	96.32	1.40	.098	.00705	.00705	1.88	0.98	
Lake Erie & Western.....	725	906	5,549	2,796	.....	2,753	49.61	7.6	123.49	137.02	.052	.110	.00614	.00648	1.89	0.59
Lake Shore & Michigan Southern.....	1,411	1,853	19,958	57,693	37,735	189.07	14.1	31.1	178.00	155.50	.067	.119	.00545	.00545	1.09	1.50	
Michigan Central.....	1,635	1,800	14,219	25,681	11,462	80.61	8.6	14.3	193.50	148.00	1.07	.087	.00592	.00592	1.19	1.11	
New York, Chicago & St. Louis.....	513	523	6,743	11,957	5,214	77.32	13.1	22.9	297.00	197.00	.059	.078	.00590	.00514	1.16	1.11	
Pennsylvania Company.....	1,396	1,750	43,967	62,073	18,106	41.18	31.5	35.5	77.95	77.95	1.77	.138	.00590	.00569	2.30	1.25	
P. C. C. & St. Louis.....	1,407	1,472	12,884	30,210	17,326	134.48	9.1	20.5	111.14	119.97	.056	.088	.00620	.00590	0.84	0.99	
Pere Marquette.....	1,821	2,330	17,727	27,727	9,783	123.15	4.3	7.0	112.64	173.63	1.25	.108	.00632	.00632	1.55	1.48	
Vandalia.....	727	876	5,922	8,821	2,899	48.95	8.1	10.1	74.46	105.98	1.21	.108	.00718	.00658	1.66	1.14	
Total.....	13,306	15,732	148,963	260,913	111,950	75.15	11.2	16.6	143.63	131.27	1.12	.106	.00645	.00610	1.57	1.17	
WESTERN CLASSIFICATION:																	
Atchafalpa & Santa Fe.....	7,426	10,771	27,486	66,213	38,727	140.89	3.7	6.1	349.19	311.33	.073	.094	.00976	.01002	0.81	0.85	
Chicago & Alton.....	855	1,026	11,667	11,667	2,281	24.30	10.9	12.3	176.16	165.51	1.35	.099	.00976	.00976	1.87	1.18	
Chicago & Eastern Illinois.....	711	12,075	8,206	26,210	18,004	219.40	11.5	20.6	144.70	159.73	1.32	.202	.00830	.00830	2.19	1.11	
Chicago & North Western.....	5,219	7,976	40,846	60,429	19,583	47.94	7.8	7.6	254.87	263.30	1.08	.177	.00830	.00870	1.28	1.11	
Chicago, Burlington & Quincy.....	7,546	9,129	42,287	55,735	13,448	31.81	5.6	6.1	151.30	140.12	1.08	.177	.00830	.00870	1.29	0.87	
Chicago, Great Western.....	930	1,496	5,782	10,891	5,109	88.36	6.2	7.3	301.68	224.42	.087	.107	.00830	.00729	1.14	1.11	
Chicago, Milwaukee & St. Paul.....	6,423	9,613	35,740	62,216	26,476	74.08	5.6	6.5	189.07	246.23	.093	.090	.00830	.00793	1.14	1.11	
Chicago, Rock Island & Pacific.....	3,647	8,048	17,150	44,064	26,914	156.74	4.7	5.2	213.00	224.76	.094	.097	.00830	.00890	1.08	0.95	
Chicago, St. Paul, Minn. & Omaha.....	1,557	1,747	10,253	12,569	2,616	225.59	6.6	7.2	160.55	153.91	.149	.189	.00830	.00860	1.39	1.16	
Colorado & Southern.....	762	1,871	2,979	10,714	7,735	259.65	3.9	5.9	101.00	154.06	1.08	.132	.01242	.00944	0.93	0.99	
Denver & Rio Grande.....	1,674	2,555	8,359	18,370	10,011	119.76	4.9	7.2	72.37	72.37	1.18	.170	.0107	.00944	1.09	1.02	
Duluth, S. S. & Atlantic.....	585	628	2,697	3,409	612	22.69	4.6	5.3	49.07	75.37	1.84	.0209	.01221	.01194	1.70	1.47	
Great Northern.....	5,418	7,750	21,484	53,595	32,111	149.46	3.9	6.9	192.00	227.02	1.04	.114	.00885	.00885	0.93	0.92	
Illinois Central.....	3,996	4,763	33,439	56,326	23,887	73.64	8.1	11.8	213.83	242.56	.092	.104	.00651	.00765	1.45	1.32	
Iowa Central.....	510	827	2,238	5,847	2,238	100.00	4.4	4.4	152.30	152.30	.099	.084	.00696	.00577	1.21	0.73	
Kansas City Southern.....	833	1,257	5,118	7,396	7,396	14.24	6.1	7.1	7.1	7.1	1.18	.089	.00613	.00788	1.49	0.73	
Minneapolis & St. Louis.....	1,595	3,976	6,631	25,064	4,330	141.22	5.1	4.7	108.79	129.12	1.29	.112	.00804	.00804	1.45	1.02	

The Operation of Large Classification Yards*

The Second Series of Papers Received in Contest,
Bringing Out Practical Ideas Gained by Experience

ESSENTIALS IN SUCCESSFUL YARD OPERATION

By E. C. TUCKER

General Yardmaster, Norfolk & Western, Portsmouth, O.

The most economical method of breaking-up and classifying trains is secured in the hump yard, which not only reduces the yard-switching movement and the operation cost to the minimum, but materially decreases the switching causes of damage to equipment. Gravity yards should be located at such points on the system as the character and the volume of traffic may require, and especially at those divisional points where terminal or junctional classification of the outgoing movement is demanded. This junctional classification is highly important, permitting the traffic to be delivered promptly and with the minimum switching expense at the junction point.

One Mallet locomotive with 30 car-riders will weigh and classify more cars in an 11-hour working day in a gravity yard than 10 switch engines and crews working in flat yards, and with fully one-half less damage to the equipment. A gravity yard is very necessary for the classification of empty cars, as such cars may be handled and classified in this manner with the least amount of delay and expense. This is an important consideration, as it is necessary to get the cars in revenue haul with the smallest loss of time, in order that the railway may secure the full value of its equipment. Every day a car is held unnecessarily when equipment is in demand means a loss of freight revenue.

Time freight trains should be classified as far as possible at the originating point. The cars traveling under refrigeration should be placed next to the engine and kept in that position to destination so that there will be no delays to time freight trains in transit due to re-icing the cars at icing stations. The despatcher should keep the yardmaster fully advised as to the expected time of arrival of these trains, and crews at terminal yards should be called in advance to avoid any loss of time on the schedule. The handling of time freight trains by the despatcher, the yardmaster and his assistant should be given the same consideration as a passenger train—careful handling, proper classification and “on time”! If this measure of service is not secured in the divisional yards the railway stands to lose rather than to increase its freight business of this character.

A very considerable and often a very unnecessary expense is attached to overcrowding and blocking of yards. This can only be controlled by the yardmaster keeping in close touch with the power and crews available, by regulating the movement according to the clear trackage, and, if necessary, by dead-heading additional crews from other terminals and moving light power to the crowded yard.

The regulating or proper balancing of power and crews by the chief despatcher should prevent yard congestion, provided the yardmaster has kept up with his classification and yard work as the traffic has reached him. A blocked yard with classified cars therein is really a question only of power and crews, and additional trains should not be forced into the yard which will block the leads and take up what little reserve classification space may have been held open by the yardmaster.

As a means of preventing delays to cars in yards, the yardmaster should define the duties of each employee and educate him to the extent that his work may assist in every proper measure toward the regular movement of the traffic through the yard. Care should be taken to avoid as far as possible any causes for special movements by making the regular movements with such promptness and so systematically that special movements will not be necessary.

Frequently cars of coal, coke or similar bulk commodities may be found to be too heavily loaded when they arrive at the scales in the gravity yard, requiring that a portion of the lading must be removed from the car before forwarding. The most economical manner of removing this excess is to set aside two short tracks in the vicinity of the scales, and place an air whistle at the scales so that a signal may be given by the weighmaster to the switch-tenders when cars are found to contain an excess of lading. The cars may then be run direct from the hump tracks into the over-load track, where a crane should be located, provided with a dipper holding about 2,000 lb. The excess can then be readily removed and placed in an empty car in front of the crane, the original car being then reweighed and allowed to go forward to destination without any unnecessary delay. Short tracks are more desirable for this purpose, as they will require the cars to be removed promptly and thus avoid congestion in the classification yard, as well as preventing delay to the shipments.

All time freight bills should be kept separate from the slow freight bills in the yard office. The system outlined below, which requires two separate racks or bill cases, has proved to be highly satisfactory. One case consists of 10 apartments for the card bills, the filing of bills in the rack being governed by the last figure in the car number. Each apartment is numbered, the numbers running from 0 to 9. Thus the bill for car number 23,646 would be filed in apartment numbered 6. This case is used for time freight only. The second case contains 100 apartments; it is square, with 10 apartments across and 10 high. The filing of the bills in this rack is governed by the last two figures in the car number. Beginning at the upper left-hand corner of the case and running horizontally across it, the apartments are numbered 00, 01, 02, 03, 04, 05, 06, 07, 08, and 09; and starting at the same corner and running vertically from the top to the bottom of the case the apartments are numbered 00, 10, 20, 30, 40, 50, 60, 70, 80, and 90. Thus, if a car number is 44,599 the bill would be filed in the extreme lower right-hand corner of the case. This case is used exclusively for bills covering everything other than the time, or preference freight. In using this described system, the bills should be filed as soon as they arrive at the yard office, so that when the train-checker brings in a list of the track from which a train is to be run the bills are readily accessible and the time consumed in picking them out is reduced to a minimum. When a car is cut out of a time freight train for any reason, the bill should immediately be stamped “Delayed car—Rush,” to insure its being handled to destination in preference movement, and the car should be forwarded from the yard in the next section of the time freight schedule.

A careful check should be made daily of all bills in the yardmaster's office. The yardmaster or his assistant should personally go through the bill cases and note the date on each card bill, and if any bill has remained in the box for 24 hours or more, and the car is yet in the yard, it should be located and movement secured without further delay.

Another feature in the handling of the bills at a large terminal is that all bills remaining in the case for a period of six days should be removed therefrom until the car is located, to avoid any cars moving out on the wrong bill or an erroneous or duplicate bill. A great many claims have been presented against railroads on account of improper movements of carload shipments from this cause. Unless the greatest care is used in securing duplicate bills and in checking the bill case, the delayed car may move from the yard on either the misplaced original or a duplicate bill, and in a second movement through the yard be improperly forwarded on one or the other of these

*The first series of papers received in this contest was published in the *Railway Age Gazette* of July 3, page 5.

bills which had been allowed to remain in the case an undue length of time.

The handling of shop cars in a large break-up yard where every car length of room is always in demand, is of large importance. Every car in bad order is not only a car out of service, but is occupying track space which could be used for cars moving under revenue load. Cars in bad order will continue to take up track room until they are repaired, and therefore the yard is serving itself best when it seeks to aid the repair department in reducing the amount of time consumed in the handling and repairing of bad order cars to the minimum.

Car repair forces can best handle shopped cars if they are given to them on the repair tracks in a classified order; that is, with reference to the heavy repair or light repair cars. Since the repairmen must handle the repair material from the supply wharves to the cars being repaired, the heavy repair cars should be placed as near as possible to the wharf carrying heavy repair material, and the light repair cars should be placed as near as possible to the wharf carrying light repair material. This will not only decrease the amount of time consumed in carrying material from wharves to cars, but will make it possible for the forces to repair the maximum number of cars daily and thereby decrease the total number of bad order cars being held each day on the yard tracks. It is also the better practice to have separate shop yards for loaded and empty shopped cars, to prevent delay to loaded cars.

Another saving in time, secured by classification of the shopped cars when placed on the repair tracks according to the amount of repairs necessary, is through the fact that each track will contain cars the repairs for which can be made in practically the same amount of time for each car, this track being ready to pull when any one of the cars is ready; no one of the cars will be delayed waiting for the other cars.

Since the repair work is usually performed out of doors, the weather plays an important part in the amount of time consumed, and if a large terminal yard should have a heavy movement of traffic with a number of days of rough weather, the accumulation of shop cars would consume badly needed track room in the yard. In districts where the weather may be inclement for long periods at a time, good results are to be secured by having 40 to 50 car-lengths of track space, in both the loaded shop yard and the empty shop yard, covered with protecting sheds so that a sufficient number of repairmen may work each day regardless of the weather.

The shop track foreman should keep the yardmaster advised as to probable time certain repair tracks will be ready to pull. Such an arrangement permits the yardmaster to include the repair track switching in laying out his work through the day, and to do this switching to the best advantage. The repair forces should endeavor to complete the repairing "by tracks," as in this way the switching work in the repair yard is kept to a minimum, the repair work is interrupted less frequently, and the entire service is carried forward in a more regular and systematic manner.

The transfer tracks should be switched at stated times each day, and by one certain yard crew if possible, in order to secure the best and quickest service. If a certain yard crew performs this service every day, it will be thoroughly familiar with the work and will know just what should be done; what kind and class of cars to spot to each shipment in bad order, and just where to place the cars to best advantage for work to be done. The periods at which the transfer tracks should be switched should be governed by the number of cars awaiting transfer of loadings, the number of cars completed, etc., but the best time for such switching and spotting is at night, inasmuch as the transfer men work during the day, and at night there will be nothing to hinder the switching crew in their work and no possibility of injuring the men of the transfer force while switch work is being done.

The yardmaster's assistants should advise the foreman of the transfer force regarding such cars as are to be given preference movement. The assistants should also make note of any loss

or damage to shipments, either before or after transfer, and also note whether the work is being carried on in the quickest and most economical way possible. Instructions require that the empty car which is to receive the lading from the crippled car shall be light-weighted before transferring is commenced. The carrying out of these instructions may require both time and expense if cars are to be specially light-weighted for this purpose, but much of this loss of time may be successfully avoided by utilizing cars which have been light-weighted after receiving heavy repairs.

The comparative expense of terminal yard operation is daily indicated in the statements of total switch engine mileage and terminal overtime. Engines employed in yard switching service are given an arbitrary mileage allowance per hour of service. This total mileage in its relation to the volume of cars handled into and out of the yard reflects the cost of yard operation, and the comparative showing from day to day, or month to month, serves as a barometer to indicate proper and economical yard management. It is therefore necessary for the yardmaster to give close attention to the number of engines employed in switching service from day to day to see that engines are not used except when absolutely required, and that the work is so systematized and given such close and constant supervision that the full maximum service be secured from each engine or switching crew.

It is primarily important, of course, that the traffic should receive good and prompt movement through the yard, but it is also of the greatest importance that the expense of yard operation shall be maintained at the lowest limit with reference to the service to be performed. In a well-regulated and economically-operated yard the methods of work will be such as to decrease the switching movement per car through the yard to the exact needs. This can largely be secured by proper grouping of cars in breaking-up incoming trains with reference to the outbound movement of such cars, so as not to handle a car repeatedly in the switching work when a fewer number of switch handlings can be made to answer the purpose.

Any condition of the yard making it impossible to take in trains promptly from the road results in the crews of such trains making terminal overtime. The expense of this road crew overtime is charged against the yard showing, and very properly so, although more frequently than otherwise the yard condition resulting in this overtime being made has been due primarily to road conditions such as derailments, power failures, etc., causing bunching of trains into the terminal and a congested condition of the yard. Not only is the expense of this overtime an absolute loss, but the effect of trains held out of the yard is far-reaching and operates to further cripple both the road and the yard movement.

HUMP OR FLAT YARDS

By W. B. HENDRICKS

Superintendent of Terminals, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.

The relative merits of hump and flat yards for the make-up and break-up of trains in transit have been a disputed question for a number of years. Considering this question, and eliminating entirely industrial and local switching, let me present some data compiled from actual performance on the Chicago, Milwaukee & St. Paul, in Milwaukee, Wis., where the break-up and make-up of east-bound trains is done by hump switching and all west-bound trains are made up in a flat switching yard.

The hump is located in the middle of three yards. Two receiving yards are west of the hump and contain 17 long tracks with a capacity of 957 cars, and 5 short tracks with a capacity of 150 cars. The long tracks will receive trains containing from 50 to 75 cars, while the short tracks are used by way freights and patrols. Five divisions entering Milwaukee from the west discharge their trains into these receiving yards, and during the busy season bring in from 2,000 to 2,500 cars a day.

The classification yard is located east of the hump. This yard

has 25 tracks for classification purposes and 8 tracks for receiving trains from the west, the latter to assist the two receiving yards, so there will be no delay in the prompt receiving of trains. It will be readily understood that when a train arrives on one of these tracks, it must necessarily pass the hump on its way in, and when switched the train must be pulled westward past the hump, but not over it, and then shoved eastward over the hump. The 25 classifying and the 8 receiving tracks east of the hump have a capacity of 2,700 cars, the longer tracks holding 70 cars.

A trimmer engine was employed both night and day, when the hump was first put in service in the fall of 1912, but this was dispensed with later on, when it was found that the work could be performed with very little delay by the engine working on the hump, after it had completed shoving the string of cars over the hump into the different classifying tracks.

The riders walk back to the hump. While this, at times, causes a slight delay, the number of riders is increased or decreased according to the volume of business. The first three cars placed on any track in the classifying yard are anchored by setting the hand brakes. During the night a green lantern is placed on the ground on each of the 25 classification tracks, to indicate the position of the last car, the rider moving the lantern to the proper position after each cut is made. Green lanterns are preferred for this purpose, as they are not as readily carried away as the red and white lanterns would be.

The pin puller on the hump announces by signal (a hand signal during the day and a lamp signal at night) to the switchtender at the junction switch, which is located about 300 ft. east of the summit of the hump, the number of the track the car is to go on, and he in turn conveys the information to the switchtender having charge of the track, who repeats the signal back to the junction switchtender. The track reference of the second cut to come over the hump is marked in chalk on the rear end of the last car on the first cut, etc.

Track No. 25 in the classification yard is an outside track used exclusively for bad order cars. It leads directly to the repair yard and is switched several times every day.

It has been demonstrated by experience that one hump rider is capable of taking care of three cars, either loads or empties, with the exception, of course, that when the loads are extremely heavy it is advisable to have two riders. Two riders can handle from three to six cars and three riders from six to nine cars, and so on. The pin lifter at the summit has charge of the riders and regulates the number required to handle the different cuts. The three yard men working on the hump engine take their turn as riders in disposing of their drag when shoving cars over.

The men are not permitted to work during the noon hour, nor is overtime allowed to be made except when absolutely necessary to handle stock and time freight. This is controlled entirely by the yardmaster.

It has been demonstrated that the maximum capacity for a 24-hour period is about 1,800 cars, our high mark being 1,836. It is only possible to reach this figure under the most favorable conditions, where most of the cuts are large, consisting of from 5 to 10 cars and upwards. The average number of cars actually moved over the hump will amount to about 1,200 for a 24-hour period. To do this work at present we are using one engine during day time and two during night time. At this writing eight hump riders are employed days and the same number nights. With the assistance of three yard men on the hump engine this increases the day riders to eleven men, and the six yard men on the two engines nights make the total number of night riders fourteen.

At each of the 25 switches located in the classification yard two skates are placed to be used in case the riders find that they cannot control the cars by the hand brakes. When this occurs the rider signals the switchtender of the track upon which the car is to go, and he places a skate upon the rails. This is done to reduce the speed of the car and prevent the destruction of equipment, particularly where the run may be short and the

rider has not the time to get the cars under control after leaving the hump. This is mostly occasioned by the hand brake failing to hold as it should or by some other defect in the braking apparatus.

The brakes on all cars are tested by the riders before the cars are cut off at the hump, and if a brake is found to be defective an additional car or cars is sent down with the cut to furnish sufficient hand braking power. It frequently happens, after brakes have been found to be apparently satisfactory at the hump, that they become inoperative when the cars are under way, and it is upon these occasions that a skate is called for by the rider.

The type of engine used at the hump is what is known as the C-2, handling trains of from 2,000 to 2,200 tons with ease. These locomotives have a weight on drivers of 189,200 lb., a tractive power of 42,800 lb., a boiler pressure of 200 lb., 63 in. driving wheels, and 23 in. x 30 in. cylinders. During the winter months a Mallet locomotive is used on the hump in place of one of the C-2's for the entire 24-hour period, being double crewed. The weight on the drivers of this engine is 323,500 lb., the tractive power 76,200 lb., boiler pressure 200 lb., and the diameter of driving wheels 57 in. These engines average from 36 to 40 miles per 10-hour period.

In making up trains in the flat switching yards we use two engines days and two nights. One of these engines—day and night—is of the same type as those used on the hump, viz., C-2. The second engine is a regular switch engine of the I-5 type, with a weight on drivers of 125,550 lb., a tractive effort of 28,158 lb., a boiler pressure of 180 lb., and driving wheels 51 in. in diameter. The average mileage made by these switch engines is about 25 or 30 miles per ten-hour day.

During the month of October, 1913, the total number of cars handled on trains in and out of Milwaukee, amounted to 133,000, or an average of nearly 4,500 a day, including Sundays. This large number of cars was about evenly divided east and westbound. Of the 67,000 eastbound cars, 55,000 were switched in the hump yard, and the balance were taken care of in what is known as the stock yards, a flat switching yard, where beer, merchandise and stock trains are made up every night, owing to the fact that the hump cannot take care of all of the business between the hours of 7 p. m., and 12 midnight. The 67,000 cars westbound are made up in trains in two different yards, on a flat switching proposition entirely.

The following statements will show a comparison of the actual expense of handling cars in hump and flat switching for October 23, 24 and 25, 1913.

Total number of cars handled by hump engines.....	5,223
Cars actually passed over the hump.....	3,437

The balance of the cars which were received at the hump yard were taken care of by the hump engines without any additional expense, but were not switched over the hump, owing to the fact that they were either stock trains or trains arriving in such condition that "humping" was not required, the engines simply making an exchange of caboose, or adding or deducting tonnage to fill the requirements of the connecting division.

Following is a table showing the expense incurred in the operation of the hump yard for the three days mentioned:

3 engineers	90 hr. at	4.25	\$38.25
3 firemen	90 hr. at	2.55	22.95
14 riders, night	420 hr. at	3.70	155.40
12 riders, day	360 hr. at	3.50	126.00
2 foremen, night	60 hr. at	4.00	24.00
2 foremen, day	60 hr. at	3.80	22.80
10 switch tenders	300 hr. at	1.92	57.60
3 car clerks	90 hr. at	60.00	18.00
2 car clerks	60 hr. at	65.00	13.00
2 car clerks	60 hr. at	55.00	11.00
2 yardmasters	60 hr. at	4.50	27.00

\$516.00

10 per cent. added for accounting and supervision.... 51.60

\$567.60

3 engines, use of	90 hr. at	8.00	72.00
3 engines, roundhouse expense	90 hr. at	2.50	22.50
24 tons coal	at	3.00	72.00
12 tanks water	at	.50	6.00
Oil and waste			2.25

Total \$742.35

This would make the cost of cars actually switched over the

hump 21.6 cents each, but as the total number of cars handled by the same employees and with the same equipment, without any additional expense whatever, amounted to 5,223, it will reduce the average cost of switching in the hump yard to 14.2 cents per car.

The total number of cars handled in the flat yards, for the same period, was 4,444. Following is a statement showing the cost of operating these yards for October 23, 24 and 25, 1913:

4 engineers	120 hr. at 4.25	\$51.00
4 firemen	120 hr. at 2.55	30.60
4 helpers, nights	120 hr. at 3.70	44.40
4 helpers, days	120 hr. at 3.50	42.00
2 foremen, nights	60 hr. at 4.00	24.00
2 foremen, days	60 hr. at 3.80	22.80
1 switch tender	30 hr. at 1.92	5.76
2 yardmasters	60 hr. at 4.50	27.00
1 yard clerk	30 hr. at 65.00	6.50
1 yard clerk	30 hr. at 60.00	6.00
Proportion of expense of other yard clerks carding cars		10.00
		<hr/> \$270.06
10 per cent. added for supervision, etc.		27.00
		<hr/> \$297.06
4 engines, use of	120 hr. at 8.00	96.00
4 engines, roundhouse expense	120 hr. at 2.50	30.00
36 tons coal		108.00
12 tanks water		6.00
Oil and waste		3.00
Total		<hr/> \$540.06

This will make the average cost of flat switching during this period 12.1 cents per car.

While these statements show that hump switching costs 2.1 cents per car more than the flat switching, it does not tell the entire story. When the hump yard was first inaugurated at Milwaukee, I was decidedly prejudiced against its use, because of the fact that a large number of cars were damaged by striking or colliding with cars standing on tracks. However, it was proved that this was mostly caused by the inexperience of the riders. At the opening of the hump yard the average number of cars damaged in a 24-hour period amounted to 35 or 40. After the riders became more experienced and knew how to handle the cars, the damage to equipment greatly decreased, and it is now a very frequent occurrence that we do not have a single car damaged in a 24-hour period. I feel safe to say that as many as ten days in every month go by without any equipment being damaged in this yard. Of course, it occurs occasionally that three or four cars will be damaged at one time, which is invariably due to the inefficiency of the brakes after the cars have left the hump. All cases of damage to equipment are thoroughly investigated for the purpose of ascertaining how the damage was brought about.

On the other hand, flat switching cars thrown down on the different tracks, and the abrupt stops required when cutting off cars, results in much damage to equipment as well as to commodities loaded in the cars. It is safe to estimate that the damage done in flat switching to equipment and freight is at least five times as great as that done in hump switching. I am therefore convinced that switching cars over the hump is more economical than flat switching, when the matter of damage to equipment and freight is considered.

THE PROPER SELECTION OF MEN

By I. T. TYSON

Assistant Trainmaster, Philadelphia & Reading, Philadelphia, Pa.

In handling any terminal, large or small, eternal vigilance and loyal employees, all working in perfect harmony, are required to bring most efficient service and economic results. The man in charge can never feel for a moment that there is nothing to do but to take life easy, look wise, and draw his salary, for that feeling spreads surprisingly fast and within a very short time everything begins to drag and irregularities and congestions appear.

I have always felt that the most important duty is the selection of men for employment. After the most careful examination has been made and the man has been accepted and put to work, his development must be watched and if it is found that a mistake has been made, and that he is not going

to make good, the only thing to do after a fair trial is to drop him from the service. On the other hand if he develops any special points keep him headed that way so that he will take more interest in his work and the results obtained will far exceed what they would had the man been kept at something for which he was not fitted.

I find it necessary to watch closely for the fellow who becomes careless, lazy or indifferent. This class of men should be eliminated immediately, before they contaminate the entire force. I have known by actual experiment where one lazy, drunken man who was permitted to remain too long in the service destroyed the efficiency of the entire force with which he came in contact because he neglected every duty possible, which naturally threw everything out of bearing and caused friction. We know how easy it is for friction to crop out among men who are being forced under high pressure all the time in a busy terminal. This friction must be stamped out immediately. I have always made it a point where there are two or more yardmasters and each begins to feel that the other fellow is rubbing it in and begins to balk, to get on the ground just as quickly as possible to show all concerned the conditions in their true light. Then all can get back into the one long steady pull.

The man who is able to keep his entire force working in absolute harmony, from the general yardmaster to the newly appointed messenger boy, has the opportunity to put his mind to new problems which may arise or which may be of benefit to some part of the service, if properly worked out and put into effect. We have always found that from the moment a man is employed he should be made to feel he is an important cog in the wheel of a great organization. The assistant yardmaster, whose duties are about the same as those of his immediate superior, must depend upon his efficiency and loyal service for advancement. The switchman who squanders a lot of money in an hour in wrong moves will correct his method if he is shown what one minute lost on each move amounts to in a day. If the car checker who marks the cars on arrival is slow he should be made to see what slowness means in dollars and cents, and if the proper material is in him there will be no more trouble.

The engine despatcher is the next to the most important man in the whole organization. He must insist upon the engine being ready for service on the minute. The men must understand that there are 600 minutes in a day of 10 hours, which the company pays them for and which it does not get if they come out late.

Even in the selection of the messenger boy the greatest care should be used. In this young man we plant the seed for the future practical railroad man. From the very start he must understand the importance of his position and be made to feel that it is his duty not only to take care of this position, but also to fit himself for the next in line as soon as the opportunity may offer for advancement. The boy that fails in this is dead timber.

After such a careful selection and training of men there should be no reason why the handling of any terminal should not be successful. The secret is eternal vigilance, with every man constantly pushing the work. We have always trained our men to understand that just so soon as the work begins to push us, it requires double the effort to get even small results.

SOME DEFECTS IN YARD OPERATION

By A. B. C.

The subject of the operation of classification yards is one of minute detail requiring continuous ability; live, personal interest and smooth-running team work on the part of all concerned. No one, I think, has yet come forward with the knowledge, the courage and the backing to increase the cost of yard operation to the point where delays to freight will be avoided. Yards generally are run too cheaply. Too often a dollar is made saving yard engine service, and lost in per diem. There is

too much judging efficiency by comparing present with past figures.

In the same yard there is little sameness in the work for the same seasons of different years. The car movement and not the expense should be, and is not, the standard. Larger yards are not needed as badly as better road movement with present facilities. Except to handle certain equipment at certain periods storage yards are a mistake. Better car movement will obviate for some time the necessity of either. Larger yards will permit ready trains to wait on power, while storage yards will tend to lose cars and lessen the per-car per-day necessary mileage. Better car distribution will avoid storing many cars.

Yard operation does not appear to have been given close enough supervision by the higher officers. Too many decisions are based on information and detail from sources lacking experience or knowledge. We have many expert traffic minds promoted from clerkships, many good managers from mechanics or operators, but few promoted yardmasters. There are not many officers with a detailed knowledge of yard work. At many points on all roads conductors are running yards who don't want the job, but who have to be used for their switching knowledge, and who, in trouble, go back to their turns.

The interchange yard, where per diem is the much discussed item; the delivery yards at termini, where cars go to floats or piers or to industries, where the biggest kicker gets the best attention; the producing yard, where freight is collected from big industries, quarries and mines, and built into trains; and the classification yard at a divisional point, where sufficient room and facilities are supposed to be furnished for the properly classified handling of goods to or towards destination; all are different, but they are all alike in that they mean car movement.

Excessive continued yard crew overtime shows an unhealthy condition. There are too few yard engines, the schedule of work is wrong, there is no system in handling the work, or team work and personal interest are lacking. If the proper number of engines is worked, and they are rightly handled, the excessive overtime will disappear, though there will always be some overtime, as no two days are alike in the detail of the work they present, and it is impossible all the time to produce results in a given ten hours. Reasonable overtime should not be objected to as we get value received for the money spent.

Our modern hump and gravity classification yards seem to have proved that despatch in handling cars in yards is preferred above the risk of damage to freight by rough handling. In many places the number of brakemen riders is too small to properly protect and handle the business; and the damage done by bad brakes, etc., is too great, particularly in handling explosives, which under our present I. C. C. regulations make many an extra car.

The general yardmaster has not a free enough hand. By reason of his duties, probably pursued, he should be in line for the position of trainmaster. Perhaps, if his jurisdiction extended over the car and roundhouse foremen, and the transfer agent, much better team work might result, provided the train despatcher took the proper interest in team work. Under present actual conditions of work surrounding a general yardmaster's duties there is too much friction. The work of a general yardmaster should be purely of a supervisory nature, and his executive ability and power to handle men should be the criterion, rather than his ability to "rawhide" night and day.

On coming into a yard the first element to be considered is the classification required, for, regardless of the physical aspect of the yard, the men, or the power supplied, particular assigned work must be done at different points.

The second item for consideration is the organization—the human element and the system of work. The kind of men and the working plan mean much, as different men produce vastly different results with a given problem of yard operation.

Next to the general yardmaster his chief clerk should be experienced and capable of handling the correspondence, as well as smaller matters of the yard extra list, and the placing of clerks. He should see that every man is at his post at the

beginning of his trick. He should have the assistance of an index or inventory clerk to handle car records and the many yard reports required. Car records by booking inbound and outbound trains, or filing by conductors trace reports, should be kept in the yard office. Such additional clerks as the work requires should be supplied.

The assistant yardmaster should be educated, trained and young. He is frequently not any of these. His education should be provided before he comes to the road, quite possibly in these days, and, if properly handled, his experience can be had from the bottom up in yard service in a very few years. He should appreciate the relative importance of all freight by a glance at the card manifest accompanying the cars; he should have a working knowledge of the freight agent's work, particularly billing; and he should be able to direct and work in harmony with his yard and road crews and subordinates. The clerk, weigher, checker, switch-tender and caller should be his men, trained and handled by him. His particular duties vary, but the proper conduct of the yard is his responsibility during his hours of service. The minute duties of his force should be considered separately with reference to requirements and circumstance in each instance.

To my mind the most important feature of yard operation is the handling of bad-order and stray or "no bill" cars. The "no-bills" should have a particular place in the yard, and the effort to locate bills should be constant and unremitting. The shop cars should have a sufficient space of their own. They should be placed and repaired promptly, and regularly taken off the repair tracks—once or twice in 24 hours, as may be demanded. There should be a positive unvaried schedule in handling this work. "Working Book" rules were made to be observed, and a yardmaster should understand the importance of strict compliance with instructions, and have cars forwarded on the time required. But if failure to carry out instructions were investigated with a view to understanding why certain things could not be or were not done, and if more consideration were extended, better results would obtain. If properly trained no yardmaster will ever disobey instructions. He will carry them out if his yard ties up provided he knows he will get the credit due obedience and good faith.

ORGANIZATION OF THE HUMP RIDERS

By E. W. BROWN

Assistant Superintendent, Lake Shore & Michigan Southern, Chicago, Ill.

Riders should be required to get on cars and have their brakes tested before the cars are cut from the train. When defective brakes are found, which cannot be adjusted with little delay, another car should be added to the "cut" and the cars allowed to drop in on some track which is not in use, where they will not be overlooked, but will be picked up later by the "roustabout" engine, or by the "hump" engine after the train is switched.

During the daylight hours riders should be instructed to get off their cuts when the speed has been reduced to a slow rate and not to kill time riding until the cars stop. Whenever a rider is given more than one car the conductor should call to him the number he has in the "cut," and if the rider feels he cannot hold these cars he should call for another rider. When taking down long cuts, or when conditions are out of the ordinary, and more than one rider is used these men should be required to get off the "cut" when the speed has been checked so that one man can handle the cars. With an arrangement of this kind in effect very few cars will be damaged in switching. When cars are damaged a brake inspection should be made by the car inspectors and a report rendered to the general yardmaster who will investigate all cases and discipline careless riders.

Good switchtenders are of the greatest importance in avoiding sending cuts onto wrong tracks. They should also keep the "hump" conductor posted when the tracks are filling up and when cuts do go wrong they will advise the conductor so that the cars may be taken out before the train is ready to leave the yard. It has been my pleasure to have switchtenders who

took as much interest in a successful day's work as I, and to whom I owe much. Switchtenders should be promoted as soon as they are qualified, thereby encouraging new switchtenders.

Where classification tracks are long, or when they are clear, the conductor should instruct the riders as to just what distance he desires the cars to go and not allow the riders to ride the cars the entire length of the track, which consumes a great amount of time for these and the following riders. To enable the general yardmaster to have proper knowledge of the amount of work done in his yard, each rider should be required to turn in to his conductor or yardmaster, at the end of each day's work, a report showing the number of "cuts" he has taken down the hill and the hours and minutes used in other work. The reports, properly checked, will show just what is being done by each set of men and one can readily locate any slow work.

The noon hour should be watched very closely and riders should not be allowed to work unless absolutely necessary. The yardmaster should have cars on the hill if possible so as to start work promptly at the expiration of the noon hour. This can be done by working two or three men during noon hour, requiring all others to take the full hour for lunch.

A SUFFICIENT NUMBER OF CLASSIFICATION TRACKS

By G. O. SARVIS

Assistant Trainmaster, Philadelphia & Reading, Harrisburg, Pa.

One of the debatable questions in the design of yards is the number and length of classification tracks. It is the writer's opinion that the best interest will be served with a larger number of classifying tracks of sufficient length to accommodate the maximum train handled on the road, rather than fewer tracks of greater length. With sufficient tracks only to provide one for each classification, even if of considerable length, circumstances will arise preventing the prompt movement of one or more classifications. These tracks will fill up and it is then possible to keep working only by combining two or more classifications on one track, which is very undesirable and ultimately results in loss of time. With tracks for each classification, and a number of auxiliary tracks, each of sufficient length to hold a maximum train, it is possible under all ordinary circumstances to avoid delay, and to keep the traffic properly classified.

Also with a classification yard consisting of one track only for each classification, the handling of preferred freight is a difficult proposition and cannot be accomplished expeditiously, without serious and costly delay to slow freight movement. With a yard having a number of auxiliary classification tracks, it is fair to assume that there will be a few tracks unoccupied and on which the preferred freight may be classified, and while this will greatly reduce the delay, it cannot be entirely eliminated. The ideal condition is a separate yard for the classification of all preferred freight, accessible without interfering with the slow freight movement.

THE NEW HAVEN'S ANSWER TO PRESIDENT WILSON

The following is the statement given out by President Hustis of the New Haven:

"The directors of the New York, New Haven & Hartford Railroad Company desire to make their position entirely clear. They have never refused, but on the contrary have always been willing and anxious to carry out the agreement with the Attorney-General made on March 21, 1914, approved by the stockholders on April 21, and sanctioned by the Governor of Massachusetts.

"That agreement was framed to accomplish two objects, first, the sale of certain properties owned by the company which the Attorney-General demanded, and second, the sale to take place at such times and on such terms as would insure a return at a fair price. This last object, in the judgment of the directors, will be defeated if the sale of the Boston & Maine stock is made subject to the condition imposed by the legislature of Massachusetts, and therefore they have declined to accept it and have stated fully the reasons for their decision.

"They have not refused to carry out any agreement which they have made, but they have refused to change that agreement, as the change would entail on the company a very large pecuniary loss and at the same time increase enormously the difficulty of reorganizing the Boston & Maine Railroad.

"As evidence of the good faith of the directors a representative committee consisting of President Hustis, Mr. Cuyler and Dr. Hadley, accompanied by Mr. Moorfield Storey, counsel in these proceedings, waited on the Attorney-General on July 20 and offered to carry through the settlement in all respects according to the agreement, and further in order to meet the difficulty which had been created by the Massachusetts legislature the committee offered to place the control of the Boston Holding Company in the hands of the trustees who had been selected by the Attorney-General and the Governor of Massachusetts, with full power to absolutely control the Boston & Maine Railroad until either the Massachusetts legislature passed the necessary legislation or the rights of the parties interested were decided by the Federal court in proceedings which the company offered to expedite in every way possible.

"In making this offer the committee did everything possible to avoid hostile proceedings without at the same time sacrificing the interests of their shareholders, and the directors only regret that an offer which seems to them eminently fair should not have been accepted.

"The following authorized statement will be issued to the stockholders:

"You authorized your directors to compromise the questions pending between the United States and the company upon the basis set forth in the statement by the Attorney-General on March 21 and submitted to you and approved by you at a special meeting of the stockholders held on April 21 last.

"You have been advised through the statement adopted by the directors on July 8 that the legislature of Massachusetts has attached a condition to the sale of the Boston & Maine stock held for this company by the Boston Holding Company to which the directors cannot assent, and in that statement the directors have given the reasons for their decision.

"Since that time a committee of the directors has conferred with the Attorney-General and has explained to him that the company cannot modify the agreement made with him by making the sale of the Boston & Maine shares subject to the terms imposed by the legislature of Massachusetts. The committee pointed out that the amount involved is very large, that in the judgment of the directors the condition would seriously depreciate the value of the stock and that it practically prevents the sale of these shares except at a great sacrifice and hampers very seriously all efforts to reorganize the Boston & Maine Railroad.

"The committee called attention also to the fact that the right which the legislature seeks to acquire by the recent act is very different from the power reserved in the acts incorporating the Boston Holding Company, since these gave Massachusetts the power not to buy the Boston & Maine shares but only the shares, "bonds, notes and other evidences of indebtedness" issued by the Boston Holding Company, and this upon condition that it took them all and at the same time relieved the New Haven company from all its obligations as guarantor of those securities.

"The New Haven company has guaranteed the principal and dividends on 272,939 shares of preferred stock issued by the holding company, of which 28,000, worth at par \$2,800,000, are outstanding in the hands of the public. These shares are all secured by a lien on the Boston & Maine shares and the proposed act gives the right to take this security without assuming the New Haven company's liabilities as guarantor.

"The Attorney-General has decided that it is his duty to bring his suit for a dissolution of the system and there is now no existing agreement between him and the representatives of the company, but the directors hope that a way will be found after the suit is brought through negotiation and action of the court to carry out the compromise agreement and thus achieve a result which all parties earnestly desire."

General News Department

The Chicago, Milwaukee & St. Paul has increased the working time of 2,000 men employed in its Milwaukee shops, from 8 to 8½ hours.

The new car shops of the Philadelphia & Reading at the coal shipping yard at Pottsville, Pa., have been turned over by the contractors to the railroad company.

The Public Service Commission of Pennsylvania and the Department of Labor and Industry of that state are holding conferences with railroad officers and with managers of industrial plants looking toward the formulation of a simpler report for state purposes, and especially for the reporting of accidents by corporations.

A joint committee of the New York City Club, the Citizens Union, the Independent Club of the West Side, the West End Association, the Twenty-third Street Improvement Association, the Washington Heights Tax Payers Association, the West Side Tax Payers Association, the Greenwich Village Improvement Association, the Woman's Municipal League, the League to End Death Avenue and the Merchants' Association has made an appeal to the Board of Estimate of the city of New York to cut short the negotiations with the New York Central looking toward some compromise on the question of the elimination of surface operation on Eleventh avenue and on the west side of New York, and to proceed immediately either through the courts or the legislature to forbid operation on Eleventh avenue unless the New York Central shall at once come to the terms asked by the city for the elimination of these tracks.

The Senate Committee on Interstate Commerce which had come to a tentative agreement on the draft of the Railroad Securities Bill, and was understood to be ready to report it to the Senate has, after a conference with Louis Brandeis and George Rubelee, decided to reconsider the bill. The objection found to the bill by Mr. Brandeis and by Senator Lippitt and Senator Brandegee was that in the form in which it was to be reported the Interstate Commerce Commission's approval of a security issue would amount to an implied guarantee by the government of the propriety of such an issue. As first agreed on the bill would have given the Interstate Commerce Commission power to investigate proposed improvements for which funds were sought, to approve issues if deemed necessary or advantageous, or to reject them if regarded as extravagant or unnecessary. The commission also would have been given power to go into court to enjoin a bond issue if made in violation of its order. Electric railways were to be exempt.

Controversy with Western Engineers and Firemen

The United States Board of Mediation and Conciliation arrived in Chicago on Monday, July 20, and offered its friendly offices in bringing about a settlement of the controversy between the Western railways and the engineers and firemen who have taken a strike vote. The request for mediation was made by the conference committee of managers, of which A. W. Trenholm, general manager of the Chicago, St. Paul, Minneapolis & Omaha, is chairman, after the representatives of the engineers and firemen had declined to join in the request on the ground that to do so would place a moral obligation on them to accept arbitration as provided for in the Newlands act. They had previously announced that they would not accept arbitration because of their claim that in past arbitrations the railroads had refused to place the awards in effect.

As briefly noted in last week's issue, the representatives of the engineers and firemen who had broken off negotiations on June 1, met with the committee of managers in Chicago on July 14, headed by W. S. Stone, president of the Brotherhood of Locomotive Engineers and W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, and presented the results of a strike vote, claiming that 99.2 per cent. of the engineers' brotherhood had voted for a strike unless

their demands were granted and 97.2 per cent. of the Brotherhood of Locomotive Firemen and Enginemen. The managers then requested that they submit in writing the results of the strike vote in detail by roads, which request was declined, in a letter stating that if the managers' committee had nothing further to offer, negotiations would be immediately discontinued and they would be notified of the time when the men would leave their service. The managers then asked for a statement of the final demands on which the men proposed to strike and were told that the men intended to stand by the final demands presented at the previous conference which were fully described in the statement issued by Mr. Trenholm on June 1, which was published in the *Railway Age Gazette* of June 5, page 1240. On July 16, Mr. Trenholm addressed a letter to Messrs. Stone and Carter, stating that as it was apparent that further negotiations between the committees would in all probability result only in reaffirmation of their relative positions without progress toward a settlement, the managers' committee requested the engineers and firemen's committee to join them in a request for the services of the federal board of mediation and conciliation. To this Messrs. Carter and Stone replied as follows:

"Your request has been referred to the joint committee representing the engineers, firemen and hostlers in the Western territory, and has been declined for the reason that should they join with you in the request to the United States Board of Mediation and Conciliation, it would place a moral obligation upon them to accept arbitration as provided for in the Newlands act. As we have stated to you on several occasions they will not accept arbitration because in our past arbitrations, the railroads have refused to place the awards in effect."

The managers then requested the services of the board and William L. Chambers, chairman, offered its services to the engineers and firemen, who accepted, but stated in the telegram "that it is unfair to ask us to wait four days before mediation begins in view of the present strained relations."

The managers' committee also issued a statement on July 17, in the form of a letter to the engineers and firemen, denying that the Western railroads had ever refused to abide by arbitration awards, and requesting that specific instances be cited in support of the charge.

The board of mediation and conciliation on its arrival in Chicago on Monday immediately went into conference with the managers' committee and the brotherhood's committee, separately, and announced its intention of holding a meeting with each committee daily.

American Railway Safety Association

A meeting of the American Railway Safety Association, which was organized in Chicago on June 9, 1913, was held on July 16, at the Hotel Bismarck, Chicago. This was the fifth meeting since the organization. At the previous meeting the election of permanent officers was postponed, pending possible action by the American Railway Association toward organizing a bureau of safety or a committee on safety within its organization. As the American Railway Association had taken no action on these plans it was decided to proceed with the permanent organization, and the following officers were elected: President, A. W. Smallen, chairman general safety committee, Chicago, Milwaukee & St. Paul, Chicago; vice-president, Isaiah Hale, safety agent, Atchison, Topeka & Santa Fe, Topeka; secretary-treasurer, L. F. Shedd, safety supervisor, Rock Island Lines, Chicago. It was decided to hold the next regular meeting of the association at Chicago in November.

On recommendation of a committee appointed at the previous meeting it was decided that the association should become an associate member of the National Council for Industrial Safety. A committee was appointed with N. D. Ballantine, assistant to second vice-president, Rock Island Lines, as chairman, to investigate and report at the next meeting on a uniform plan of

reporting accident statistics. It appeared that the safety departments of various roads were using different methods in compiling their reports of injuries, some following the rules of the Interstate Commerce Commission regarding the reporting of injuries to that body, which requires the report of an injury only where the injury causes the employee to lose three days' time, while some roads include in their reports all injuries, regardless of whether time is lost, and others only report injuries that cause the loss of time, thus making it difficult to make comparisons between the safety records presented by different roads. A committee was also appointed to compile statistics of automobile accidents at crossings, with a view to conducting a campaign of education among automobile owners and manufacturers.

Following the completion of the routine business of the meeting, the meeting was thrown open to general discussion of safety methods. E. R. Scoville, of the general safety committee of the Baltimore & Ohio, gave an outline of the work on that road, which was reorganized on January 1, with a general safety committee of seven members to give all their time to the work. J. G. Pangborn, formerly special representative of the president, is chairman, and the other members of the committee include a superintendent of motive power, a division engineer, a division superintendent, a medical examiner, a supervisor of safety service, and a former inspector of the Interstate Commerce Commission. The General Safety Committee usually attends meetings of all of the division safety committees, 20 in all, each month, and have a car assigned to their use. The committee reports to the third vice-president, and obtains special authority for expenditures recommended by the division committees, which are of such a nature that they cannot be taken care of out of the funds allotted to the divisions. The general committee recently spent one month in visiting large terminals on the road other than the division headquarters where the regular division meetings are held. A large number of separate meetings were also held with various classes of employees, the men being paid for the time spent at such meetings. For the month of July one member of the committee is attending the division meetings and the others are traveling over other parts of the system, inspecting conditions. A. A. Krause, commissioner of safety, Missouri, Kansas & Texas, also spoke briefly regarding the safety work on his road. M. A. Dow, general safety agent, New York Central Lines, described some of the features of the safety work on the New York Central Lines, and distributed samples of some of the literature used. He said the most important feature of the work was the education of employees along safety lines. During the past year 100,000 men have attended the meetings held in the safety exhibit car. Special shop meetings were held which were attended by every man working in the shop. His department has issued a leaflet of 40 special safety rules, which are supplemental to the regular operating rules, which the men are required to keep in the rule books, and on which they are required to pass an examination. He also described the use of a safety work card, which is filled out when special work is recommended for certain divisions, one copy being left with the division superintendent and the other mailed to his office. When the work is completed the superintendent fills out the card mailed to him stating that the work has been completed. If the work is not done within 30 days, it is taken up by his office from the card records. He also outlined plans which are now being worked out for the use of moving pictures in the campaign during the next winter. J. D. M. Hamilton, claims attorney of the Atchafalaya, Topeka & Santa Fe, spoke of the importance to the railroads of exercising more care in the inspection of men before they are hired, to see that they are qualified for their work, and the education of these men after they are in service. He said that railroads must seek to obtain a higher degree of perfection in the employees, and to eradicate habits of carelessness which have been acquired through long practice, and because the men have never been taught any better. He also dwelled on the necessity of teaching the men habits of concentration on their work. Several other members spoke along the same lines. L. F. Shedd, of the Rock Island Lines, said that under the present workmen compensation laws the railroads are running insurance companies without knowing what risks they are taking, unless the men are examined thoroughly before they are hired. J. M. Guild, of the Union Pacific, told of the plan recently adopted by the Union Pacific for keeping in touch with good men that apply for jobs, but who cannot be put to work at once. Waiting lists have been established, so that when men are needed the road

has an opportunity to make better selection. Mr. Hamilton was appointed chairman of the executive committee; Mr. Guild of the committee on publicity and entertainment; and C. T. Banks, of the Northern Pacific, of the committee on membership.

Crossing Accident on the Virginian

An electric train of two cars on the Virginia Passenger & Power Company's line from Ocean View, Va., to Norfolk ran into a train of 71 empty cars on the Virginian on the night of July 16, killing four people and injuring a considerable number of others. From unofficial accounts it would appear that the train of empty coal cars was in considerable part past the crossing when the electric cars, fairly well crowded with people returning from Ocean View, either disregarding the regulations to stop before the crossing or for some season unable to do so, crashed into the train almost at right angles, breaking it in two, overturning the electric cars and derailling two or more of the gondola cars.

American Railway Tool Foremen's Association

The following is a list of the exhibitors at the convention of the American Railway Tool Foremen's Association, held at the Hotel Sherman, Chicago, on July 20 to 22:

- American Specialty Company, Chicago.—Drill sockets. Represented by H. S. Mills and C. N. Weakes.
- Brown & Sharpe Company, Providence, R. I.—Machinists' tools. Represented by R. C. Brown and R. E. Doras.
- Carborundum Company, Niagara Falls, N. Y.—Carborundum and aloxite wheels, and aloxite and carborundum cloths, and valve grinding compounds. Represented by C. C. Schumaker, H. P. Frost and E. P. Ritzina.
- Chicago Pneumatic Tool Company, Chicago.—Air and electric drills, pneumatic hammers, speed recorders. Represented by C. E. Walker, P. F. Flaven, J. C. Campbell, J. L. Camby, C. B. Coates and Chas. H. Schumasken.
- Cleveland Twist Drill Company, Cleveland, Ohio.—Twist drill reamers. Represented by Herbert S. White and A. L. Beardsley.
- Colonial Steel Company, Pittsburgh, Pa.—High speed saws, drill rods, 11/16 in. punch shown through 1 1/4 in. steel, examples of steel fractures, photographs. Represented by T. W. McManus and M. P. Spencer.
- Crerar-Adams & Co., Chicago.—Jacks, die starters, pipe benders, wrenches. Represented by Russel Wallace and W. I. Clock.
- Crucible Steel Company of America, Pittsburgh, Pa. Represented by Mr. Baskerfield.
- Detroit Twist Drill Company, Detroit, Mich.—Drills, reamers, milling cutters, sleeves, sockets, chucks. Represented by M. F. Crawmer.
- Faessler Manufacturing Company, The, Moberly, Mo.—Catalogs, Represented by G. R. Maupin.
- Grip Nut Company, Chicago.—Testing machines, deflecting machines, samples grip nuts. Represented by B. C. Hooper.
- Halcomb Steel Company, Syracuse, N. Y. Represented by Garson Myers.
- Independent Pneumatic Tool Co., Chicago.—New electric tools, new air turbines, small S. S. compound drills. Represented by Robert T. Scott, Geo. Wilson, Harold Henricks and Wm. Gummere.
- Ingersoll Rand Company, New York, N. Y.—Pneumatic tools. Represented by N. O'Connor.
- Lutz-Webster Engineering Company, Philadelphia, Pa.—Lutz no-set screw lathe dog, Lutz no-handle ratchet, Lutz one-piece drill ratchet, Lutz adjustable self-feed drilling post, solid and swivel arm; Lutz compression wrench for all finished or rough surface stud driving. Represented by Wm. H. Lutz.
- Manning, Maxwell & Moore, Inc.; Ashcroft Manufacturing Company; Consolidated Safety Valve Company; The Hancock Inspirator Company, New York.—Hancock inspirators, boiler checks, Consolidated safety valves, Ashcroft pressure gages, prismatic water glasses and other locomotive appliances. Represented by C. L. Brown.
- Midvale Steel Company, Philadelphia, Pa.—Catalogs. Represented by F. W. Sager.
- National Machinery Company, Tiffin, Ohio.—Single motor driven bolt cutter and die sharpener. Represented by Chas. Harmon, Jr., and K. L. Ernst.
- Norton Company, The, Worcester, Mass.—Two 2 1/4 in. Model C grinders, equipped with Model P protection hoods; one stand showing wheel broken in its hood; one stand showing exhaust system-line of tool-room wheels; booklets on Safety First grinding. Represented by J. W. Horne.
- Racine Tool & Machine Company, Racine, Wis.—High speed metal cutting machines. Represented by J. M. Jones and Wm. Richards.
- Rich Tool Company, Chicago.—High speed tool. Represented by O. F. Schubert.
- Ryerson, Joseph T., & Son, Chicago.—Model of a punch and boiler tools. Represented by L. H. Bryan, C. R. Gregg, H. C. Williamson and H. G. Merriell.
- Strong-Carlisle & Hammond Company, Cleveland, Ohio.—Randall graphite sheet lubricator, Mac-it set screws. Represented by B. E. Carpenter.
- Weaver Manufacturing Company, Springfield, Ohio.—Weaver roller jaw chucks. Represented by C. F. Hodgson.
- Western Tool & Manufacturing Company, Springfield, Ohio.—Tool holders, expanding mandrels, lathe dogs. Represented by J. Z. Wells.
- Whitman Barnes Company, Akron, Ohio.—Drills, reamers, wrenches. Represented by A. O. Wange and M. E. Townner.
- Williamson, H. C., Chicago.—Metal band saw. Represented by H. C. Williamson.

American Boiler Manufacturers' Association

The American Boiler Manufacturers' Association will hold its twenty-sixth annual convention at the Waldorf-Astoria, in New York, from September 1 to 4. An invitation to attend has been extended to all boiler, tank and stack manufacturers, fabricators of steel plate and representatives of supply companies.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, I. C. R. R., East St. Louis, Ill.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wednesday, except June, July and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, May, September and November and 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.
- ENGINEERS' SOCIETY OF PENNSYLVANIA.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 605 Grand Central Station, Chicago; Wednesday preceding 3d Thursday, Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick Bldg., Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.
- MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.
- MASTER CAR & LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.
- NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frakenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
- RAILROAD MASTER TINNERS, COPPERSMITHS & PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I. Danville, Ill.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.
- RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.
- RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.
- RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.
- RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle Station, Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.
- TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.
- TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.
- TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago.
- TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.
- TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.
- UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago; 3d Tuesday of each month, except June, July and August, Karpen Bldg., Chicago.
- WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

During the month of May, the Atchison, Topeka & Santa Fe "California Limited" train arrived on time in Los Angeles and Chicago terminals 59 out of a possible 62 times.

Returns made to the committee on relations between railroads of the American Railway Association show that on July 15 the total freight car surplus was 228,384 cars, an increase of 7,509 as compared to July 1. The total shortage on the same date was 1,843 cars, an increase of 508.

The Lumbermen's Association of Chicago has addressed a letter to all its members, urging them to co-operate with the railroads by loading cars to full capacity, thereby reducing the number of cars required to handle its products and releasing them for use in the grain traffic, and to appeal to the consumer to co-operate by unloading cars as promptly as possible. With the letter is sent a letter to be sent out by individual firms to be sent to other mills.

The City Club of Chicago has published a book of 89 pages, by George E. Hooker, civic secretary of the club, on Through Routes for Chicago's Steam Railroads, which discusses the Chicago terminal and local transportation system in detail, with many maps and charts, and advocates the plan of through-routing the suburban trains of the steam railroads by means of subways through the central portion of the city, to give passengers on one road direct access to other portions of the city now served by the other roads.

Agreement Reached on Intermountain Rate Case

Following a recent conference between traffic officers of the western transcontinental railways and the Interstate Commerce Commission at Washington, an agreement has been reached providing for the final disposition of the entire intermountain rate cases by January 1, 1915, and for putting into effect most of the rates involved by October 1 of this year. As the order of the commission, which was recently sustained by the Supreme Court, dates from June 22, 1911, a new effective date had to be set on which the order should become effective. On July 9, the carriers submitted to the Interstate Commerce Commission a petition which has now been granted by the commission to extend the effective date of the order from June 22, 1911, to October 1, this year, in order to enable the carriers to compile and publish rates to conform to the order, with the exception of 107 commodities on which they ask further consideration. The roads submitted to the commission with the petition three schedules of rates.

Schedule A is a list of commodities on which the rates to Pacific coast terminals will apply as maxima to intermediate points, and on which no relief is requested. These include rates on such commodities as fruit, grain, flour, vegetables, products of the soil, agricultural implements, building material, etc., particularly those rates in which the individual is much interested as a consumer, upon some of which the carriers consider the rates low, but on which they will continue to apply the coast rates as maxima.

Schedule B consists of commodities subject to water competition at the Pacific coast terminals, but on which the rates from the Missouri river to the Pacific coast by rail are generally not less than \$2 for less than carload lots, and \$1 for carload lots, and as to which the carriers will observe the fourth section rule of the commission, applying only such percentages over the through rates at the intermediate points as were designated for the respective zones in the original order of the commission.

Schedule C is a list of 107 commodities covering generally manufactured articles subject to the most severe water competition, and on which the rates to the coast are less than \$1 in carloads, and \$2 in less than carloads, which rates the carriers consider subnormal to a marked degree, measured by any recognized standard that has been fixed by the commission as reasonable, but which are necessary to move a share of this

water-competitive traffic by rail; also to enable manufacturers and shippers at points of production not located directly on the Atlantic seaboard to share in the trade of the Pacific coast. These rates are so low that the carriers consider they should not be used as a basis for rates to interior points. Schedule C embraces such articles as sulphate of ammonia, chloride of calcium, carbide of calcium, canned fruit, fish, corn, meat, mincemeat, tomatoes, etc., green coffee, cotton piece goods, hardware and tools, pig iron, structural iron, iron fence, iron posts, iron pipes, wire fencing, paint, paper, rice, radiators, sectional boilers, etc., pig and slab tin, and insulated copper wire.

The rates on commodities named in schedules A and B will become effective on October 1, therefore, when the carriers will have in effect new schedules conforming either literally to the fourth section of the Interstate Commerce act or taking only such percentages over the through rates as were designated for the respective zones. As to the rates in schedule C, the carriers asked sufficient time to present to the commission such evidence as, in their opinion, will completely justify a greater degree of relief from the provisions of the fourth section than was granted in the order. The carriers now feel that they can present convincing facts and arguments in support of such modifications of the order as to these rates. As to these rates the commission agreed to grant a hearing beginning in Chicago on October 6, to afford the carriers opportunity to present their evidence. Of the 107 items, 67 are carload and 40 less than carload rates. By stipulation of the carriers they agree that after this hearing, or after the commission has given consideration to the data there presented, they will, on January 1, without delay, comply with the order of the commission in toto.

The commission also determined slightly to modify zone boundary lines fixed in the original order so as to make the zones upon diagonal traffic from Lake Superior regions to the south Pacific coast, and from Galveston to the north Pacific coast to conform to the zones already fixed in the tariffs applicable to class rates.

It will thus come about that by October 1, on 372 commodities in carloads, and 41 commodities in less than carloads, the fourth section order will be fully operative. Since the issuance of the original order, by agreement with the intermountain shippers, commodity rates from all eastern points to intermountain points have been established on all commodities involved that move in sufficient volume to justify commodity rates. This made a very considerable reduction in previous rates. The commission had previously reduced all class rates from eastern points to all intermountain territory and the roads have established class rates to the coast based on a scale of \$3.70 New York to the coast.

Shippers Asked to Co-operate for Car Efficiency

W. S. Tinsman, chairman of the Association of Western Railways, has issued the following circular letter addressed to shippers and receivers of freight, industrial traffic managers and commercial organizations, asking their co-operation in promoting the most efficient use of freight car movement during the crop-moving season to avoid the possibility of car shortage:

"Two years ago in anticipation of the large tonnage which the railroads would be required to move as a result of the heavy crops of that year, this association appealed to the shippers and receivers of freight for co-operation in obtaining the maximum use of freight equipment. The results of that appeal, and the interest manifested by the shippers throughout the country, were very gratifying.

"The present prospect of exceptionally heavy crops, as evidenced by the tables attached hereto, warrants an appeal of the same nature at this time.

"In spite of the fact that a great surplus of cars has existed for some time, the surplus of box cars is not so great as to warrant any feeling of security, and unless the co-operation suggested below can be had, the prospects are for a difficulty in moving these crops which may affect disadvantageously the interests of the shippers and receivers alike.

"The railroads are making every effort which their resources will permit to put cars in condition for service and in other directions to prepare themselves to handle the traffic with promptness.

"Shippers and receivers, commercial organizations and others

having to do with the commerce of the country, are earnestly urged to lend their efforts and influence in every way possible to bring about the most economical use of equipment, and the following suggestions are made for which the widest publicity is solicited:

"First.—Move all the coal, lumber, cement and other supplies that you can before the heavy crop movement starts.

"Second.—Load and unload all cars as quickly as possible. (If, without additional cost, the use of greater force will get the load ready for movement or the car released more quickly, do it.)

"Third.—Load all cars to the full capacity. (A leeway of 10 per cent. above the marked capacity is permitted before reduction of load is required. All cars should so far as possible be loaded to a weight between the marked capacity and 10 per cent. above.)

"Fourth.—Anticipate the disposition of freight before its arrival.

"Fifth.—Only order such cars as can be loaded promptly. (Orders for cars should state the number required for that day's loading, the kind of cars, the final destination of the shipment, and the routing via which it will move.)

"Sixth.—Reduce to the minimum the practice of billing cars to intermediate points to be held for reconsignment."

The circular also includes tables of the crop reports for previous years, with the estimates for this year, as an indication of the probable demand upon the carriers for equipment during the coming season, and says: "The greatly increased crops here indicated cannot but be reflected in the movement of other freight, or fail to impress upon the minds of every one interested in the subject, the necessity for the most hearty co-operation on the part of all if a serious car shortage and its accompanying damage to all lines of trade is to be avoided."

Another table gives information as to the general situation with respect to cars available, with comparisons for previous years. These figures indicate an increase in the number of available cars in the western territory, as well as in the whole country, and taking into consideration the increase in the average capacity of all freight cars the improvement is substantial. For 1913, for the western states, the number of freight cars owned was 6.41 per mile of road, as compared with an average from 1907 to 1913 of 6.04. The percentage of cars in shop was 6.7. For the entire United States the number of freight cars owned was 2,127,314, as compared with an average of 2,019,681, or 10.03 per mile, as compared with an average of 9.79, and the percentage in shop was 7.30, as compared with an average of 6.85. Exclusive of cars in shop the number of cars per mile of road was 9.30, as compared with an average of 9.12. About 40,000 copies of the circular have been sent out, including a large number to newspapers.

James E. Quan, chairman of the Illinois Public Utilities Commission, has issued a statement saying the Illinois roads have informed the commission that 20,650 new cars will be available on seven lines, in addition to the old equipment, for handling the grain movement this season, and that the roads are exerting every effort to have their equipment in proper condition. The cars are to be delivered by August 1, and 120 new locomotives are to be delivered to the roads in the state by that time. "We expect few or no complaints of car shortage this year," says the commission, "notwithstanding the fact that the crops are the largest ever known. All that is necessary is that shippers and receivers of grain co-operate with the railroads by prompt action in loading and unloading cars in order that they may be promptly available for other service."

The office of markets of the United States Department of Agriculture has made inquiries in Texas, Oklahoma, Kansas, Missouri, Nebraska, Iowa and Illinois as to the possibilities of a car shortage for movement of grain this fall. The report of this investigation says in part:

"The sentiment is by no means universal among the country elevators that there will be a car shortage. The belief that there will be a shortage is most prevalent among the country elevators of Kansas. Expressions from terminal elevator points indicate that there will be a shortage in all states.

"On the part of the roads statements from officials through the press are given to the public and growers, and elevator men are personally advised by local agents, traveling freight agents and other representatives, of all steps taken to minimize shortages."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Molasses Rates to Knoxville, Tenn.

Opinion by Commissioner Hall:

The commission finds that the carriers are justified in canceling a special rate of 25 cents on "blackstrap" molasses in carloads from New Orleans to Knoxville and restoring in its place the domestic rate of 33 cents on all other molasses, except in so far as the 33 cent rate may violate the long and short haul clause in comparison with a rate of 32 cents to Bristol, Tenn. (30 I. C. C., 613.)

Cotton Rates to Augusta, Ga.

Augusta Cotton Exchange & Board of Trade v. Southern Railway. Opinion by the commission:

The commission finds that the rates on cotton to Augusta, Ga., from stations in South Carolina on the Southern Railway are unreasonable to the extent that they exceed rates from the same point which were in effect prior to September 23, 1909, the rates then in effect being on the basis of the South Carolina scale as are the present class rates. (30 I. C. C., 704.)

Lumber Rates from Batesville, Miss.

Southern Hardwood Traffic Bureau, for the benefit of R. J. Darnell, Inc., v. Illinois Central et al. Opinion by the commission:

The commission finds that the rates on lumber, other than cottonwood and gum from Batesville, Miss., to points in central freight association, western trunk line and trunk line territories are not unreasonable, but they are discriminatory to the extent that they exceed the rates to the same destinations from Sardis, Miss., a point nine miles north of Batesville. (31 I. C. C., 6.)

Increases in Rates on Fencing Allowed

In re rates on fencing and fencing material from Anderson and other points in Indiana to Texarkana, and other points. Opinion by Commissioner Harlan:

The commission finds that the carriers are justified in increasing from 37 cents to 40 cents per 100 lb. the present rate on fencing and fencing materials from Anderson, Crawfordsville, Kokomo, Muncie and Richmond, all in Indiana, to Texarkana. No substantial reason is given for the charging of a lower rate for shipments of fencing materials from the five Indiana points named, than is charged on similar shipments from other points in Chicago-Cincinnati territory. (30 I. C. C., 650.)

Switching Charges on Ice in the Chicago District

Peoples Fuel & Supply Company v. Grand Trunk Western et al. Opinion by the commission:

The Minneapolis, St. Paul & Sault Ste. Marie, and the Grand Trunk Western, in compliance with an order of the commission, established a joint rate on ice from Silver Lake, Wis., to a point of delivery on the tracks of the Grand Trunk Western in Chicago. There having been a dispute as to divisions, the commission finds that the Soo line should allow the Grand Trunk Western the regular reciprocal switching charges applicable under the provisions of the Lowrey tariff to reciprocal switching in the Chicago district. (30 I. C. C., 657.)

Lumber Rates from Thebes, Ill.

Opinion by Commissioner Meyer:

The commission finds a proposed cancellation of proportional rates on lumber and forest products from Thebes, Ill., to points in southwestern Illinois on the Chicago, Burlington & Quincy via the St. Louis, Iron Mountain & Southern to Herrin and the Chicago, Burlington & Quincy beyond to be justified because of the discontinuance of the physical connection at the interchange point. It is ordered, however, that the rates via the route over

the Chicago & Eastern Illinois, or over the latter to Goreville and the Chicago, Burlington & Quincy beyond should be maintained upon the same relative basis as the rates charged to competitors located on the St. Louis & San Francisco. (31 I. C. C., 15.)

Grain Transit Privileges at St. Louis

Merchants Exchange of St. Louis, Mo., v. Baltimore & Ohio et al. Opinion by Commissioner Meyer:

The commission deems that the record in the case is not sufficient to enable it to determine the reasonableness of the regulations requiring shippers to surrender their expense bills covering inbound shipments in order to obtain the benefit of reshipping rates from St. Louis, Mo., and East St. Louis, Ill., to central freight association and trunk line territories, which rates apply regardless of the point of origin of the original shipment. The case is therefore reopened and set to be heard with *Southwestern Missouri Millers' Club v. Chicago & Alton* at an early date to be announced later. (30 I. C. C., 700.)

Increased Rates from Maine Refused

In re class and commodity rates from stations in the state of Maine. Opinion by Commissioner Meyer:

The commission finds that the Maine Central has not justified charges in its tariffs whereby it will eliminate stations east of Lewiston and Brunswick in the Ellsworth group from the list of stations taking the Boston rates and apply to the eliminated territory differentials over the Boston rates on traffic destined to central freight association territory. The carrier has not sufficiently shown the necessity of such an increase in rates by the presentation of statements of earnings per ton mile and proof of increased general operating expenses, nor has it shown that the rates heretofore maintained yield less than a fair return. That the average length of the haul is slightly in excess of the haul from points from which it is proposed to continue the Boston rates does not prove that the rates under suspension are just and reasonable, no evidence having been offered as to the reasonableness of the Boston rates. (31 I. C. C., 18.)

Kelly's Creek Colliery Case

Hughes Creek Coal Company et al. v. Kanawha & Michigan et al. Opinion by Commissioner Meyer:

In the original case of *Kelly's Creek Colliery Company v. Kanawha & Michigan*, reported in the *Railway Age Gazette* of April 10, page 850, the commission held that the defendants should establish through routes and joint rates on coal between stations on the Kanawha & Michigan and its branches and various eastern and southeastern territory on the lines of the Chesapeake & Ohio and its connections and that as reasonable rates for these routes defendants should apply rates not in excess of those applying to those destinations for shipments from the mines on the Chesapeake & Ohio. Upon reconsideration of the case the commission now holds that there may properly be a slight difference between the rates applicable to the through routes ordered and those applicable to the single movement over the Chesapeake & Ohio. The difference, however, must not exceed five cents per ton.

Intermediate and Joint Rates

Humphreys-Godwin Company v. Yazoo & Mississippi Valley et al. Opinion by the commission:

The complainant made carload shipments of cottonseed meal from Helena, Ark., to certain New England points. The shipments were consigned in the first instance to itself at Louisville, Ky., but while en route, defendants at Louisville were furnished with instructions to forward the shipments to the respective New England destinations. The joint through rate was 33 cents; the sum of the intermediate rates via Louisville was 30½ cents. Upon complaint alleging that the shipments to and from Louisville were separate and distinct transactions and that the shipments should have been charged at the intermediate rates, the commission finds that the shipments were not handled under such circumstances as to have constituted separate and distinct shipments to and from Louisville, and that although the fact that a joint rate exceeds the sum of the intermediate rates over the same through route raises a strong presumption that the joint through

rate is unreasonable to the extent that it exceeds the sum of such intermediate rates, the presumption is not conclusive and may be rebutted by evidence to the contrary. Under the circumstances of the instant case the presumption of unreasonableness inhering in the 33-cent rate is held to be satisfactorily rebutted by the evidence. Complaint dismissed. (31 I. C. C., 25.)

Rates from the Twin Cities to Dakota Points

Minneapolis Civic and Commerce Association v. Chicago, Milwaukee & St. Paul. Opinion by Commissioner Meyer:

Complaint is made that the class rates from Minneapolis and St. Paul to South Dakota and North Dakota points on the Hastings & Dakota division, the James River Division (now consolidated with the Hastings & Dakota division) and the trans-Missouri division of the Chicago, Milwaukee & St. Paul, are unreasonable per se, and discriminatory. The three operating divisions referred to constitute that part of the transcontinental line of the Chicago, Milwaukee & St. Paul which crosses the northern part of South Dakota, and the southwestern corner of North Dakota, and the branch lines running northward and southward from the main line. Comparisons are made between the rates from the Twin Cities to the points of destination involved and the distance tariffs of Minnesota and Iowa for intrastate traffic; the rates from Minneapolis to Iowa points on defendant's line; the rates to South Dakota points on defendant's line to Rapid City, S. D.; the rates for equal distances from Chicago and Milwaukee to points in Minnesota, Iowa and South Dakota and the rates from the twin cities and from Duluth to points in North Dakota on the lines of the Great Northern and Northern Pacific, which, it is argued, bear out complainants' contentions. The commission finds, however, that the existence of undue discrimination is not proven in the rates from the twin cities to South Dakota points, as compared with those to the same points from competing markets, and that to a certain extent carriers are justified in placing competitive markets on an equal basis. It is also held, however, that in many instances the rates involved are unreasonable in that they increase in the movement westward greatly out of proportion with the increase in distance. A new table of rates is prescribed, therefore, for distances varying from 200 to 600 miles, which, it is believed, will remove this discrepancy. (30 I. C. C., 663.)

Switching Charges at Seattle

Transportation Bureau of the New Seattle Chamber of Commerce et al. v. Great Northern. Opinion by Commissioner Meyer:

The commission finds that defendant's class E rate of 3 cents per 100 lb. applicable to shingles and lumber moving in carloads from Ballard to Seattle for interchange at the latter place with other roads is not unreasonable in so far as it results in charges not greater than \$10.50 per car. At one time defendant moved cars from industries on its Sobey Spur at Ballard to the Chicago, Milwaukee & St. Paul's car barge slip at Ballard from which the cars were carried on floats to Seattle and charged for the service at a switching rate of \$3 per car. The construction of the Lake Washington Canal necessitated the abandoning of the barge slip and for a time cars were taken by the defendant to Seattle at a charge of \$4.50 per car, which it is proposed to supersede by the new rate. Complaint is made that the three cent rate is excessive, particularly since it prohibits the former absorption of switching charges that were in force for traffic destined to competitive points. As has been noted above, the commission finds that the increased charge is not unreasonable. The Chicago, Milwaukee & St. Paul no longer maintains terminals at Ballard. The Great Northern, on the other hand, contends that it is entitled to the long haul and that it is not proper that the St. Paul should be allowed to compete for this traffic originating on the Great Northern's terminals at a charge which does not compensate the latter for so affording the use of its terminals to its competitor. The commission believes that the arrangement suggested by the Great Northern for joint rates between it and the St. Paul on the flat Seattle basis, applicable to traffic from complainants' mills to non-competitive local points on the latter road is a proper one and should be adopted even though the St. Paul may lose all of the traffic to competitive points. Apart from the possible consequences flowing from the nature of the service or the form of the charge, defendant's contention that the com-

mission should prohibit the absorption by competitive roads of its established charges applicable to the movement over its terminal between Ballard and Seattle, is held not to be sustained. The commission's duty is to pass upon the reasonableness of the established charges, and the act does not require that in so doing it shall take into its calculations the consideration of the possibility of the absorption of the charge by competitive roads. (30 I. C. C., 683.)

Rates on Fresh Fruits from Grand Rapids and Other Points to Milwaukee

Milwaukee Produce & Fruit Exchange v. Crosby Transportation Company et al. Opinion by Commissioner Hall:

The Crosby line is a water carrier operating its own steamers for a year round service across Lake Michigan between Milwaukee and Grand Haven. During that time of year when Muskegon is open a side trip service is also maintained between that port and Grand Haven. Boats are also operated in the fruit picking season on the Grand River to Grand Rapids and Grand Haven. By virtue of a contract by which the Crosby Line began in 1906 to perform the Grand Trunk's break-bulk service across Lake Michigan, certain joint rates and through routes were canceled which had been in effect between the steamship line, the Grand Rapids, Grand Haven and Muskegon and electric line, which operates a service from Grand Rapids to Grand Haven, with a branch from Grand Haven Junction north to Muskegon, nearly the whole service in direct competition with that of the Grand Trunk. The commission finds that the former through route and joint rates between the electric company and the steamship company, from points on the former line to Milwaukee except Grand Rapids, Grand Haven and Muskegon, where the service of the Grand Trunk, alone, is sufficient, should be re-established insofar as is necessary to provide for the transportation of fresh fruits, it having been found that a very large portion of the fresh fruit business from the region on the electric line west of Grand Rapids had been diverted from Milwaukee. (30 I. C. C., 653.)

Railroads and Private Business

The commission has submitted a report to Congress in response to a resolution passed about six years ago concerning the relations of railroads to coal and oil properties. The report deals chiefly with certain large purchases of coal lands in Illinois by the Cleveland, Cincinnati, Chicago & St. Louis for the purpose of protecting the future coal supply of the New York Central Lines. In it the commission criticizes the management of the latter and makes the following recommendation:

"From the facts related herein, particularly those discovering the industrial railways around St. Louis and those describing the relations of the New York Central Lines to coal properties in Illinois, the commission believes it important that the public business of transportation should be clearly separated from private business; that railroads should be prohibited from furnishing directly or indirectly capital or loans to private enterprises; that railroads should be prohibited from extending the use of their credit for the benefit of private individuals or companies, and that the commodities clause should be enforced and extended to all traffic."

The commission finds that the New York Central Lines through the Big Four in 1905 began to acquire coal lands in Saline and Williamson counties, Illinois, and purchased altogether 23,000 acres. The plan, the report says, originated with W. C. Brown and was carried out by him through S. W. McCune and Charles P. Hewitt, Mr. Brown's brother-in-law.

"Many irregularities took place in connection with the purchase of these properties and both McCune and Hewitt profited substantially. The irregularities were accomplished by the use, apparently, of one or more of the following devices: (1) by preparing vouchers for amounts in excess of those actually received by the grantors of the properties sold to the Big Four; (2) by taking lands in Hewitt's name and turning them over to the Big Four at advanced prices; and (3) by secreting the legitimate commissions in the purchase prices and then passing additional vouchers in favor of Hewitt as his alleged commission on the same land. Hewitt definitely asserted that he was not aware of these acts.

"Funds so pilfered from the Big Four were handled in the

same manner as were legitimate commissions, i. e., deposited in McCune's bank account and then divided with Hewitt, the latter's share passing through Mr. Brown's hands to the bank at Clarinda. Mr. Brown asserts that he had no way of verifying the amounts sent to him by McCune and they were merely passed through his hands for Hewitt's convenience. Traveling auditors of the Big Four in 1909 checked over the vouchers and other papers in connection with these coal land purchases, but failed to report the irregularities mentioned.

"The record does not show that Mr. Brown had any knowledge of irregularity in the purchase of the properties. The only charges that can be made against him in connection with the pilfering of the funds of the company of which he was an executive are these (1) he placed McCune, without bond, in a responsible position, involving the expenditure of over \$1,000,000, to which trust, the record shows, that person was unfaithful, and (2) he assigned to a lucrative position netting nearly \$25,000 in a little over a year, a relative, who was not competent even to handle his own money affairs, was inexperienced in the work itself and was lacking in the most ordinary business ability."

W. C. Brown and other officers of the New York Central took an active part in the promotion of the Saline County Coal Company and the O'Gara Coal Company. The report charges that the latter company has been granted a great many unusual concessions, and from the time it began shipping coal to within the last year it has been a preferred institution of the New York Central Lines, and that the carriers have practically supported the company for years. In September, 1913, the O'Gara Coal Company went into the hands of friendly receivers, the investigations of the commission having caused the New York Central to restrict its support.

"Many of the concessions described were skillfully concealed and some were discovered almost by accident. The attempts of Mr. Brown and others to explain the concessions leave much to be desired. In short, they amount to ignorance of the rebates mentioned, while as to loans, advances and extensions of credit, Mr. Brown and his associates admit knowledge of the practices, but claim to have been actuated by a desire to protect the fuel supply and the traffic of their lines by protecting a patron from the financial disaster that would otherwise occur. It is significant, in this connection, that among the hundreds of industries along the 13,000 miles of the New York Central Lines, the carriers should have overlooked all moribund concerns except one of those in which the carriers' officers were interested."

Speaking of a tentative plan of consolidation which contemplated that the Chicago & Harrisburg Coal Company, owned by the Big Four, would issue bonds guaranteed by the latter, and purchase its coal lands and the mines and lands of the companies mentioned above, whereupon there was to be formed an operating company to which the mines and part of the land would be leased for operation, the report says:

"W. C. Brown and other officers testified that the plan never received serious consideration and in all probability would never be effected. It is worthy of mention, on the other hand, that in the latter part of 1913 the capital stock of the Chicago & Harrisburg Coal Company was increased from \$55,000 to \$150,000 and that the company began taking over the coal and coal lands owned by its parent company, the Big Four. Whether this is the beginning of a gigantic coal proposition involving the purchase of the Saline and O'Gara properties and based on the credit of the New York Central Lines, the record does not disclose. Such a use of railroad credit for the private ends of favored individuals should obviously receive, if carried out, the severest condemnation of law."

STATE COMMISSIONS

Illinois Public Utilities Commission has issued an order on complaint of the Springfield Commercial Association, ordering the steam roads to switch cars for the Illinois Traction System at Springfield and to allow the traction system the use of their tracks for switching at that point.

The Illinois railroads, through the Illinois Freight Committee, asked the Illinois Public Utilities Commission last week for permission to increase certain rates within the state, within the maxima fixed by the commission. The commission announced that the petition would be considered within 30 days.

The Railroad and Public Service Commission of Montana announces that a general reduction in freight rates, averaging 20 per cent., is to go into effect in Montana, on July 29, as the result of a conference between the commission and representatives of the principal railroads. It appears that the railroads voluntarily proposed tariffs prepared on the same basis as those in effect in the state of Washington. The new tariffs do not affect so-called distributing rates from the jobbing centers.

According to press reports, the members of the Texas Railroad Commission have given informal consideration to a plan to appeal to Congress for legislation clearly defining the powers and duties of the Interstate Commerce Commission, so that it cannot interfere in any way with state commissions in the fixing of rates between points within the states, in order to obtain for the Texas Commission relief from the decision of the United States Supreme Court and the Interstate Commerce Commission in the Shreveport rate case.

The Michigan Railroad Commission has issued an order against the Pere Marquette, Lake Shore & Michigan Southern, Michigan Central and Detroit, Grand Haven & Milwaukee railways, requiring them to issue, and make effective by September 1, a tariff which shall provide that on the tender by shippers at any one time during cold weather, of 10,000 lb. of any perishable commodity for shipment to stations on the main line of the road serving the shipping point, or on the payment of the charges on 10,000 lb., a refrigerator car must be furnished.

The California Railroad Commission has recently been holding a hearing on complaint by residents of the San Francisco peninsula, against the passenger fares in effect on ferry and electric lines of the Southern Pacific between San Francisco and Oakland. Some of the trans-bay fares were lowered in October, 1913, after a hearing by the commission, from 15 cents to 10 cents one way. In answer to the present complaint the company has requested the commission to advance these fares from 10 cents to 12½ cents. After a hearing in June the case was adjourned for 60 days, to allow attorneys for the complainants to consider the data submitted by the company. This included a valuation of the property involved, and figures to show that the revenue from the ferries and the electric service is not sufficient to meet the cost of operation, plus interest and taxes.

PERSONNEL OF COMMISSIONS

S. N. Mills has been appointed an inspector for the Interstate Commerce Commission and has been assigned to the work of investigating and testing signal and train control systems and other safety devices. Mr. Mills received his early education in the public schools of Minnesota and later completed a course in electrical engineering. He entered the service of the Interstate Commerce Commission in September, 1906, and was chief clerk of the Block Signal and Train Control Board throughout the five-year period of its existence. When that board was abolished in June, 1912, Mr. Mills was assigned to the commission's accident-investigation work. In December, 1913, the work of investigating and testing devices was again taken up by the commission under the act of October 22, 1913, and Mr. Mills was one of the first men assigned to this service. On May 1, 1914, he was appointed an inspector and assigned to field work.

COURT NEWS

The Mississippi supreme court has dismissed a suit brought by the state railroad commission against the Louisville & Nashville to compel the company to stop certain through passenger trains at Bay St. Louis, Miss. A fine of \$402,000 had previously been imposed on the company by the lower court because of its refusal to obey the order of the commission.

Judge Landis, of the United States district court at Chicago on July 17 issued a decision ordering F. W. Ellis, vice-president of the Armour Car Lines, to answer questions asked of him by the Interstate Commerce Commission in connection with its investigation of private car lines. At the time of the commission's hearings in Chicago in January, Mr. Ellis declined, on advice of counsel, to answer questions regarding the private business of the company.

Railway Officers

Executive, Financial, Legal and Accounting

George H. Winsor has been appointed auditor and traffic manager of the San Benito & Rio Grande, with headquarters at San Benito, Tex., to succeed C. T. Davis, resigned.

W. R. Campbell, at present assistant to president of the Susquehanna & New York, the Tionesta Valley and the Leetonia Railway, has been appointed vice-president of the Susquehanna & New York, with office at New York, effective August 1, succeeding E. C. Hoyt, resigned, and the title of assistant to president has been abolished.

Operating

E. E. Cain, superintendent of the Toledo-Ludington division of the Pere Marquette, has been appointed superintendent of the Chicago-Petoskey division, with headquarters at Grand Rapids, Mich., succeeding J. W. Mulhern, resigned.

James Patrick Houston, whose appointment as superintendent of the Eastern division of the Minneapolis & St. Louis, with headquarters at Oskaloosa, Iowa, has already been announced in these columns, was born April 5, 1865, at Durand, Ill. He received a common school education and began railway work in 1875 with the Chicago, Burlington & Quincy, with which road he remained until 1886, being employed consecutively as water boy, flagman, brakeman and operator and agent. The following two years he was with the Western Union Telegraph Company as operator, and from 1888 to 1899 he was despatcher and chief despatcher for the Chicago Great Western. He was then with the Great Northern for three years as chief despatcher and trainmaster, going to the Chicago Great Western in 1902 as chief despatcher. Subsequently until 1909 he was trainmaster, and in the latter year he became trainmaster of the Minneapolis & St. Louis. Later he was made assistant superintendent, which position he held at the time of his recent appointment as division superintendent, as above noted.

Traffic

A. J. Blaisdell has been appointed general agent of the passenger department of the Canadian Pacific at St. Louis, Mo.

J. S. Henney, traveling freight agent of the Toledo, St. Louis & Western at Cleveland, Ohio, has been appointed commercial agent at Kansas City, Mo.

F. R. Hanlon has resigned as district freight agent of the Oregon-Washington Railroad & Navigation Company at Seattle, Wash., to become traffic manager of the port of Seattle.

W. R. Busenback has been appointed general agent, freight department, of the Erie at Akron, Ohio. The headquarters of J. H. Hackett have been removed from Akron to Marion.

J. S. Brown, general freight agent of the Illinois Central, has been appointed manager of the transportation department of the Board of Trade of Chicago, succeeding E. B. Boyd, resigned.

The territory of H. C. Dinkins, general agent of the Gould Lines for Mexico, has been extended over West Indies, Central America and South America, with offices at New Orleans, La., and Galveston, Tex.

C. A. Torrence, foreign freight agent of the Missouri Pacific, the St. Louis, Iron Mountain & Southern, and Denver & Rio Grande, with headquarters at Chicago, will also have jurisdiction over the Western Pacific, effective July 15.

M. T. Dean, at present assistant to general manager of the Tionesta Valley and the Leetonia Railway, has been appointed general freight and passenger agent of the Susquehanna & New York, the Tionesta Valley and the Leetonia Railway, with office at New York, effective August 1, and the position of assistant to general manager has been abolished.

Engineering and Rolling Stock

F. L. Beal has been appointed valuation engineer of the Louisiana & Arkansas, with headquarters at Stamps, Ark., reporting to F. W. Green, general manager.

E. A. Sweeley, who recently resigned as supervisor of car repairs of the Atlantic Coast Line, has been appointed master car builder of the Seaboard Air Line, with headquarters at Portsmouth, Va. He will have jurisdiction over the entire car department.

John L. Mohun, formerly in the motive power department of the Pennsylvania Railroad, has been appointed assistant to consulting engineer of the Union Pacific, the Oregon Short Line and the Oregon-Washington Railroad & Navigation Company, with headquarters at New York. Mr. Mohun began railway work as an apprentice at the Altoona shops of the Pennsylvania Railroad, and was successively assistant master mechanic of the Juniata shops, master mechanic and assistant engineer of motive power of the New Jersey division, with office at Jersey City, N. J.

OBITUARY

P. J. Halloran, chairman of the executive board of the Brotherhood of Railroad Conductors, died suddenly of heart disease in Boston on July 16.

Eugene E. Osborn, formerly vice-president of the Chicago & North Western, died at Frederick, Md., July 20, aged 60 years. Mr. Osborn was born at Norwalk, Conn., May 1, 1854, and was a graduate of the Sheffield Scientific School of Yale University. He entered railway service in 1894 as general attorney for the Chicago & North Western. In June, 1901, Mr. Osborn was elected vice-president and secretary of the North Western and assistant secretary of the Chicago, St. Paul, Minneapolis & Omaha, which positions he held until his retirement from active service in 1911.

RAILWAY CONSTRUCTION IN KYUSHU, JAPAN.—The length and estimated cost of the lines projected at present by the government railways on the Japanese island of Kyushu are as follows: Yatsushiro-Sendai line, 67 miles, \$6,500,000; Kumamoto-Oita line, 83 miles, \$8,250,000; and Saheki-Miyazaki line, 88 miles, \$8,500,000.

THE HEDJAZ RAILWAY TO ARABIA.—It is enjoined upon Moslem pilgrims without fail to visit Medina and Mecca at least once in their lives. At one time, the trip from Damascus to Medina was a journey by caravan of 35 to 40 days' duration. With the construction of the railway, the journey has been reduced to but 58 hours. Most of the pilgrims use the railroad in order to get to Medina and then return the same way and embark at Haifa or Beirut for Jedda, the nearest port to Mecca on the Red Sea. Arrangements have been made whereby there are steamers in waiting at Beirut and Haifa for the trains from Mecca so that immediate embarkation is possible. The Turkish government has for some time worked to extend the railway to Mecca and thus entirely eliminate the route by sea. At present, the distance from Medina to Mecca takes 12 days by camel through an arid desert so pilgrims prefer to return north and reach Mecca by the sea route. Until last year, only first and third class cars were in use, but lately second class cars have been introduced and commodious sleeping cars have been added for the benefit of first class passengers. For this accommodation an additional charge of about \$4.40 is added to the price of a first class ticket. The trains make five stops daily for a sufficient length of time to enable the Moslems to make their required devotions. There are comfortable dining rooms at Derra and Maan and native buffets at some of the smaller stations, such as Tebouk, Aman and Medam-Salih. The fares are as follows: From Haifa to Medina and return—first class, \$52.10; second class, \$39.07; third class, \$26.05; from Damascus to Medina and return, first class \$50.95; second-class, \$38.24 and third-class, \$25.08. The rates from Damascus are slightly less. From the first of Chaaban (June 24) to the end of Zelcaade (October 18) a special reduction of 50 per cent. is allowed on the above prices. Non-Moslems are allowed to travel only a part of the way because their entrance into Medina and Mecca is rigidly prohibited.

Equipment and Supplies**LOCOMOTIVE BUILDING**

THE CENTRAL OF GEORGIA is in the market for 4 Pacific type locomotives.

THE EL PASO BELT has ordered 2 locomotives from the Baldwin Locomotive Works.

THE COLORADO, WYOMING & EASTERN is in the market for 2 Mikado type locomotives.

THE SKANEATELES RAILWAY is in the market for one six-wheel switching locomotive.

THE RUSSIAN GOVERNMENT is asking prices on a large number of locomotives of various types.

THE ATLANTIC COAST LINE is in the market for a number of Mountain and Pacific type locomotives.

WINSTON BROTHERS COMPANY, Minneapolis, Minn., are in the market for 8 or 10 six-wheel switching locomotives.

THE INTERCOLONIAL RAILWAY OF CANADA has ordered 3 switching locomotives from the Montreal Locomotive Works.

THE CHICAGO, BURLINGTON & QUINCY has ordered 15 Santa Fe type locomotives from the Baldwin Locomotive Works.

THE STANDARD OIL COMPANY OF NEW JERSEY has ordered one switching locomotive from the Baldwin Locomotive Works.

THE NORTHWESTERN PACIFIC is in the market for 4 ten-wheel passenger, 2 ten-wheel freight and 3 six-wheel switching locomotives.

THE CHILEAN STATE RAILWAYS are proposing the purchase of 125 locomotives as part of a plan for the rehabilitation of the railways of Chile.

THE CAROLINA SPRUCE COMPANY, Philadelphia, Pa., has ordered one 70-ton Shay geared locomotive from the Lima Locomotive Corporation.

THE ILLINOIS CENTRAL is in the market for 50 Mikado type and a number of Pacific type locomotives, and for a number of locomotives for hump-yard service.

THE INTERNATIONAL RAILWAYS OF CENTRAL AMERICA, reported in the *Railway Age Gazette* of last week as having ordered 5 locomotives from the Baldwin Locomotive Works, have ordered 5 Consolidation locomotives of that company.

THE BANGOR & AROOSTOOK has ordered 5 superheater Consolidation locomotives from the American Locomotive Company. These locomotives will have 23 by 30 in. cylinders, 56 in. driving wheels, a total weight in working order of 213,000 lb., and a steam pressure of 175 lb.

THE DULUTH & NORTHEASTERN has ordered 2 consolidation and 2 70-ton Shay geared locomotives from Lima Locomotive Corporation. The former will have 20 by 24 in. cylinders, 50 in. diameter driving wheels, a weight on the driving wheels of 128,000 lb. and a total weight in working order of 144,000 lb.

THE SOUTHERN PACIFIC has ordered 20 superheater Mikado type passenger and 10 superheater switching locomotives from Lima Locomotive Corporation. The Mikado locomotives will have 26 by 28 in. cylinders, 63 in. diameter driving wheels, a weight on the driving wheels of 218,000 lb. and a total weight in working order of 305,000 lb. The switching locomotives will have 19 by 26 in. cylinders, 51 in. diameter driving wheels and a total weight in working order of 155,000 lb. Both the Mikado and switching locomotives will be equipped for oil burning.

CAR BUILDING

THE CHILEAN STATE RAILWAYS are preparing plans for the purchase of about 400 freight cars.

THE CHICAGO GREAT WESTERN has ordered 500 40-ton box cars from the American Car & Foundry Company.

THE BALTIMORE & OHIO has awarded a contract to the Ryan Car Company, Chicago, for the repairing of 2,000 box cars.

THE INTERCOLONIAL RAILWAY OF CANADA is in the market for 8 all-steel sleeping cars and one all-steel compartment observation car.

THE DELAWARE, LACKAWANNA & WESTERN, reported in the *Railway Age Gazette* of June 26 as being in the market for 55 all-steel suburban coaches has increased its inquiry to 110.

THE NEW YORK CENTRAL LINES have ordered, 1,250 gondola cars each from the Ralston Steel Car Company and the Haskell & Barker Car Company. These cars will be put in service on the Toledo & Ohio Central.

THE UNION PACIFIC order for 107 passenger cars from the Pullman company, as reported in the *Railway Age Gazette* of May 29, is divided as follows: 15 69-ft. baggage, 2 75-ft. baggage and buffet, 10 60-ft. postal, 5 60-ft. baggage, 4 69-ft. baggage and postal, 21 72-ft. 6-in. dining, 8 72-ft. 6-in. observation, 2 70-ft. parlor cars, 5 60-ft. coaches, 5 70-ft. coaches, 10 60-ft. chair, and 20 70-ft. chair cars.

IRON AND STEEL

THE CHICAGO & WESTERN INDIANA has ordered 1,200 tons of rails from the Illinois Steel Company.

THE INTERMOUNTAIN has ordered 1,200 tons of rails for immediate shipment from the Illinois Steel Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 115 tons of steel for a 100-ft. through plate-girder turntable, from the American Bridge Company.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has ordered 276 tons of material for deck girder spans at Bedford, Ind., from the Wisconsin Bridge Company.

THE ARTHUR IRON MINING COMPANY has ordered 131 tons of steel from the American Bridge Company, Chicago, for a locomotive repair shop for the Dunwoody mine, Chisholm, Minn.

THE BOSTON & MAINE, which recently ordered 5,000 tons of rails from the Pennsylvania Steel Company, has placed an additional order of 5,000 tons, divided equally between the Bethlehem Steel Company and the Lackawanna Steel Company.

CHICAGO, ROCK ISLAND & PACIFIC.—The item in the *Railway Age Gazette* of last week to the effect that this company had ordered 17,000 tons of rails from the Colorado Fuel & Iron Company was incorrect. The company has, however, ordered 10,500 tons from the Illinois Steel Company.

SIGNALING

The Southern Railway is preparing to install a telephone block system to take the place of the telegraph system now in use on the Atlanta division between Macon, Ga., and Ooltewah, Tenn., a distance of 225 miles and part of the route for the Southern Railway's through trains between the west and Florida.

The telephone is now being used for despatching trains and handling messages over the entire line of the Alabama Great Southern between Chattanooga and Meridian, the circuits between Chattanooga and Birmingham having just been completed and put in service. The line from Birmingham to Meridian has been in service since June 1. With the completion of the circuits on the Alabama Great Southern the telephone is now being used for despatching over the entire line of the Queen & Crescent route between Cincinnati and Meridian, a distance of 630 miles.

TRANSPORTATION FACILITIES IN SOUTH MANCHURIA.—South Manchuria railway runs daily and thrice weekly express trains from Dairen connecting with the Trans-Siberian Railway, the Peking-Mukden and the Kirin-Changchung lines of the Chinese government railway, the Korean government railway and the Dairen-Shanghai direct mail steamers. Steamships leave weekly (in some cases twice a week) for ports in Korea, Japan and China. It is said that the Korean government railways are attempting to secure the bulk of the freight transportation between Japan and Manchuria.

Supply Trade News

Announcement is made that J. M. Oden has severed his connection with B. E. Tilden & Company of New York and Chicago.

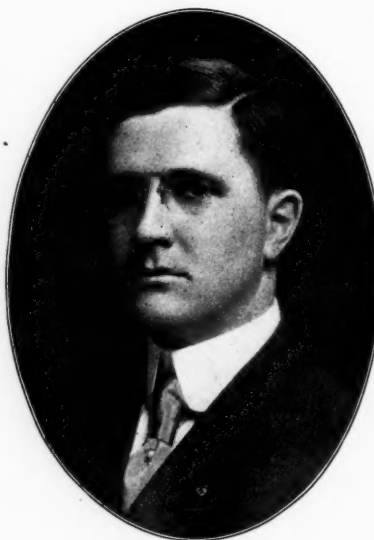
The Pennsylvania Equipment Company, Philadelphia, Pa., has moved its office from the West End Trust building to 503 Coleman building, 15th and South Penn square.

John W. Dix has been appointed assistant general sales manager and structural engineer of the Carnegie Steel Company, Pittsburgh, Pa., effective July 15, succeeding John C. Neale, who has resigned to become president and general manager of the Central Steel Company, Massillon, Ohio.

Edward N. Lake, Chicago representative of the Stone & Webster Engineering Corporation, sailed on the *Lusitania* on July 14 with the party accompanying the Chicago Railway Terminal Commission, which is making a six weeks' study of European railway practices with special reference to terminals.

W. D. Jenkins, who has for several years been private secretary to Judge Freeman, general counsel of the Texas & Pacific, and who is well known in southern railroad circles, has been appointed southern representative of the Union Railway Equipment Company, Chicago, with office in the Whitney Central building, New Orleans, La.

John H. Wynne, who since May 1, 1914, has been manager of sales of the Montreal Locomotive Works, Montreal, Que., graduated from the regular course at Cornell University in 1898, and



J. H. Wynne

from the special post graduate course in 1899. He immediately entered railway service as a special apprentice on the Illinois Central. Three years later he went to the Procter & Gamble Company, Ivorydale, O., in the capacity of shop engineer, but in the following year returned to the Illinois Central as a gang foreman. After working in that position for a short while he became a general foreman on the Pennsylvania Lines at West Richmond, Md. In 1904 he again returned to the Illinois Central, however, and served as mechanical engineer at Chicago. In April, 1906, he entered

the supply field, taking the position of manager of the Chicago office of the Atlantic Equipment Company, and in September, 1910, went to New York as general sales manager. On February 1, 1912, he entered the service of the American Locomotive Company as manager of its Rogers & Cooke plants, and retained that position until, on May 1, he reached his present position as manager of sales at Montreal. Mr. Wynne in addition is also in charge of the design of small locomotives for industrial service.

Joseph T. Ryerson & Son, Chicago, have taken over the plant, merchandise, equipment and good will of the W. G. Hagar Iron Company, St. Louis, Mo. It is the intention of the company to supplement the plant of the latter with complete modern warehouses and equipment for the handling and cutting of shapes, reinforcing bars and similar heavy material. Ryerson & Son will thus be able to render immediate service in their lines of finished steel to customers in the territory tributary to St. Louis.

C. W. Cross has been appointed Chicago representative of the Equipment Improvement Company, with headquarters at 30 Church street, New York. Mr. Cross began his railroad experi-

ence with the Pennsylvania Lines West and left that system when assistant master mechanic at Fort Wayne to become master mechanic of the Lake Shore & Michigan Southern, with headquarters at Elkhart, Ind. He was made superintendent of apprentices of the New York Central Lines in 1906 when that system revised and centralized its apprenticeship department to meet modern conditions. Mr. Cross' work in the development of this department requires no comment, as it is widely known and understood.

Colonel H. G. Prout has resigned as president of the Union Switch & Signal Company. W. D. Uptegraff, formerly vice-president, has been appointed president pro tempore. Sydney G. Johnson, vice-president in charge of sales, has also resigned, no successor being appointed. T. W. Siemon, treasurer and assistant secretary of the Westinghouse Electric & Manufacturing Company, has been made secretary-treasurer of the Union Switch & Signal Company, succeeding James H. Johnson, resigned.

TRADE PUBLICATIONS

ELECTRIC INDUSTRIAL LOCOMOTIVES.—The Westinghouse Electric & Manufacturing Company has recently issued a four-page folder illustrating a number of Baldwin-Westinghouse electric industrial locomotives.

CONCRETE REINFORCING.—Joseph T. Ryerson & Son have issued a second edition of Technical Library No. 8, entitled "Concrete Reinforcing." The same company has also issued bulletins Nos. 9,071 and 13,071, descriptive respectively of the Ryerson high-speed friction saw and the Lennox serpentine shear.

AIR BRAKES.—The Simplex Air Brake & Manufacturing Company, Pittsburgh, Pa., has issued a 14-page booklet descriptive of the construction and operation of its locomotive air brake equipment. This circular contains a colored diagram showing the arrangement of parts and the action of the valves and controlling device.

LIGHTING OF MACHINE SHOPS.—The General Electric Company of Schenectady, N. Y., has just published a very well illustrated bulletin describing the lighting systems which can be applied to machine shops and metal working plants. As a supplement to this bulletin there is published a table showing the characteristics of Edison Mazda lamps used for standard lighting service.

TELEPHONE CABLE.—The Western Electric Company has recently issued a 15-page booklet entitled "The Making of the Voice Highways," descriptive of the manufacture of lead covered telephone cable. The booklet goes into a brief consideration of the several steps involved in the making of the product and contains a large number of views taken in the shops where it is made.

HYDRAULIC PRESSES.—The Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, has recently issued catalog No. 40 containing 128 pages, 8 by 11 in. in size, showing representative views of the company's line of hydraulic presses. Specifications and descriptions are given of each press illustrated, and a brief statement of the work of which it is capable. The book also contains a number of interesting views of the company's plant.

CEMENT GUN.—The Cement Gun Company, New York, has issued an elaborate 107-page catalog devoted to the description of the cement gun apparatus, its principle and mechanical construction; the cement gun product, "Gunite," and its applications and adaptability. This book contains many illustrations showing the method of application and also the finished work. Many letters of engineers and construction men commenting on the use of "Gunite" are also reproduced in this catalog.

LIFTING THE QUEBEC BRIDGE.—The Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued an interesting 16-page pamphlet, devoted to the general description, and the method of erection of the new Quebec bridge over the St. Lawrence river. The general description of the bridge and conditions to be contended against are taken from a paper by H. F. Stratton, which appeared in the December, 1913, issue of the *Engineering Magazine*. The Electric Controller & Manufacturing Company, which is furnishing all the electrical equipment, gives an interesting account of the electrical control of the apparatus used in the erection work.

Railway Construction

CALGARY & FERNIE.—The Railway Commissioner of Canada has approved the application of this company to build a 174-mile line from Fernie, B. C., through Kananaskis pass and Elbow pass, thence along the south branch of the Sheep river, through the oil fields and through the Sarcee reserve into Calgary, Alta. J. R. Lawreyn, S. S. Manahan, Victoria, B. C., and A. Mutz, Fernie, are interested. (January 2, p. 50.)

DENVER & RIO GRANDE.—An officer writes that a contract has been awarded to C. Wells, Denver, Colo., for the grading for a 16-mile narrow gage line from Caliente, Taos county, N. Mex., to La Madera, to connect with the lumber line of the Hallack & Howard Lumber Company of Denver, Colo. The line will have a maximum grade of $2\frac{1}{2}$ per cent., and a 16 deg. maximum curve. Other work than the grading will be done by the company forces. J. G. Gwyn, Denver, Colo., is chief engineer.

DENVER & RIO GRANDE.—According to press reports, work has been started on a 16-mile branch from Caliente, N. M., southwest. This line is to connect with a line to be built by the Hallack & Howard Lumber Company, of Denver, Colo., which is also to be 16 miles long.

EXPORT PHOSPHATE RAILWAY & TERMINAL COMPANY.—Under this name a line is being built, it is said, for the Export Phosphate Company, of Mulberry, Fla., to a phosphate drying plant near Tampa, also a number of branch lines, in all about 50 miles. E. L. Blood, president; H. E. C. Capewell, vice-president, and E. A. Pierce, secretary and treasurer.

FAIRMOUNT & VEBLEN.—The Greenville & Southeastern has asked for incorporation in South Dakota with a capital of \$50,000 to build a 10-mile line from Roslyn, S. Dak. This is a section of the Fairmount & Veblen extension building from Veblen, southwest to Webster, 40 miles.

GREAT NORTHERN.—An officer writes that the Montana Eastern, which started work some time ago on a line from New Rockford, N. Dak., west to Lewistown, Mont., has track laid from Fairview, Mont., east to Arnegard, 30.4 mile. A north and south line has also been completed from Sidney, Mont., north via Fairview to a connection with the main line at Snowden, 25 miles. A. Guthrie & Co., St. Paul, Minn., had the contract for this work. It has not yet been definitely decided when other sections of the line will be built.

GREENVILLE & SOUTHEASTERN.—See Fairmount & Veblen.

MISSOURI ROADS.—According to press reports, capital has been secured and surveys are being made for a line to be built from Springfield, Mo., southeast to a connection with the St. Louis, Iron Mountain & Southern at a point south of Mountain Home, Ark., about 100 miles. E. C. MacAfee, Springfield, Mo.; K. V. Loba and H. S. Wickersham, North Yakima, Wash., are interested.

MOBILE & OHIO.—It is reported that this company is preparing to double-track its line between Corinth, Miss., and Jackson, Tenn. B. A. Wood, chief engineer, Mobile, Ala.

MONTANA EASTERN.—See Great Northern.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has awarded six contracts for as many sections of the subway system, aggregating \$21,035,185. The most important is that for the construction of the East River tunnels from downtown Manhattan to Brooklyn awarded to the Flinn-O'Rourke Company, newly formed by the O'Rourke Engineering Company and Booth & Flinn, Ltd., who submitted a joint bid of \$12,444,726; \$6,469,916 being for the Interborough tunnel from Old Slip, Manhattan, to Clark street, Brooklyn, and \$5,974,810 for the New York Municipal Railway tunnel from Whitehall street, Manhattan, to Montague street, Brooklyn. Contracts were also awarded for the construction of section No. 1 of route No. 12, a part of Eastern Parkway subway in Brooklyn, to the Cranford Company, for \$2,195,296; section No. 2 of route No. 20, the Canal street railway in Manhattan, to the Underpinning & Foundation

Company, for \$1,822,994; section No. 7 of route No. 5, the portion of the Lexington avenue subway from Forty-third to Fifty-third streets, to Rapid Transit Subway Construction Company for \$1,915,165, and section No. 2 of routes Nos. 4 and 36, the portion of the Broadway subway from Twenty-sixth to Thirty-eighth streets, to the United States Realty & Improvement Company for \$2,657,005.

NORTHERN PACIFIC.—This company, it is said, is planning to construct a branch line from Beach, N. D., southeast 25 miles in Golden Valley. W. L. Darling, chief engineer, St. Paul, Minn.

SEATTLE, PORT ANGELES & LAKE CRESCENT.—A perpetual franchise for the use of the streets for railroad purposes in Port Townsend, Wash., has been granted to C. J. Erickson, president of this company, which is building from a point near Oak Bay, Wash., west via Irondale, Chimacum valley, Sequim Dungeness valley and Port Angeles to the Lyre river, thence west past Lake Crescent into the Olympic timber district. Work has been finished on 25 miles. The franchise gives the company control of much of the water frontage and provides a route for an extension to a tidewater terminal in Port Townsend. (July 3, p. 40.)

SOUTHERN RAILWAY.—A contract has been given to Robert Russell, Danville, Va., for building a new double track cut-off between Danville and Dry Fork, 12.95 miles, to eliminate a heavy grade, and reduce the curvature between these two places which are on the existing line. The work will include a double track bridge over the Dan river.

TAMPA & GULF COAST.—A contract is reported let to Morrissey, Bouly & Company, for work on the extension building from Belleair, Fla., south, thence east to St. Petersburg. (May 15, p. 1119.)

RAILWAY STRUCTURES

BUTTE, MONT.—The Chicago, Milwaukee & St. Paul has awarded a contract for the grading work for its new passenger station at Butte, Mont., to Guthrie, McDougall & Company, Spokane, Wash.

MOUNT AIRY, N. C.—The Southern Railway has given a contract to Porter & Boyd, Charlotte, N. C., for building a new granite passenger station at Mount Airy.

NEW YORK.—The New York Central & Hudson River has given a contract to R. P. Johnson, New York, for erecting the superstructures, including timber work, concrete work, paving and all incidental work, for 12 overhead bridges and one railroad bridge on the Hudson River division.

NEW YORK.—The Lehigh Valley has awarded contracts for dredging and other preliminary work for a large ore pier in the Constable Hook section of Bayonne, N. J., fronting on New York Bay, which will be the northern terminus of a line of ore-carrying steamers to be used by the Bethlehem Steel Company to bring iron ore from its deposits in Chile via the Panama Canal. It is said that the steel company plans to import at least 750,000 tons of ore annually. The pier will be 1,150 ft. long and 67 ft. wide. There will be a basin 200 ft. wide, and a channel will be dredged that will have a depth of 35 ft. at low tide. The pier will be equipped with modern unloading machines, two of which will be able to work in one vessel at the same time with a maximum capacity each of 500 tons an hour. The site is known as the old French oil yard and adjoins the plant of the Standard Oil Company. It is directly on the line of the Lehigh Valley, which is intending to establish yards at this point with a capacity at first of 350 cars.

TEXAS CITY, TEX.—Work has been started on improvements at the Texas City ocean terminal of the Texas City Transportation Company. The work includes building a steel and sheet metal warehouse along the north side of pier A to cover an area of 880 ft. by 163 ft. Dredging work is also to be carried out in the slip alongside the new structure. The work will cost about \$110,000.

SIBERIAN RAILWAY CONCESSION.—St. Petersburg advices state that a Frenchman has secured a concession for a South Siberian trunk line of about 1,300 miles, which will require an outlay of about \$80,000,000.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—This company has leased the Oklahoma Central, which for a number of years has been in the hands of a receiver.

LANCASTER, OXFORD & SOUTHERN.—This company ceased operation of train service on July 1. The reasons given for this are that the operation of the road did not pay, although it might at some time be taken over by some other railroad.

LAS VEGAS & TONOPAH.—This road, it is understood, is to take over the Bullfrog & Goldfield, which runs from Rhyolite and Betatey to Goldfield and parallels in part the Las Vegas & Tonopah. The plan is said to have been approved by the Nevada State Railroad Commission, and provides for the abandonment of parts of the parallel lines and the reconstruction of the remainder so as to make available for one line the best parts of the two existing lines.

LEWISBURG & NORTHERN.—See Louisville & Nashville.

LOUISVILLE & NASHVILLE.—The Louisville & Northern, a subsidiary of the Louisville & Nashville, began operation on Wednesday, July 15. This road runs from Brentwood, Tenn., to Athens, Ala.

MISSOURI PACIFIC.—A committee has been formed for the protection of holders of 5 per cent. notes of the Missouri Pacific which were extended to June 1, 1915. This committee consists of Edwin G. Merrill, president of the Union Trust Company, New York; Stephen Barker, president of the Bank of the Manhattan Company; Howard Bayne, vice-president of the Columbia-Knickerbocker Trust Company, New York; Louis V. Bright, president of the Lawyers' Title Insurance and Trust Company; A. B. Hepburn, chairman of the Board of the Chase National Bank, and Henry Ruhlender, of Speyer & Company, New York.

NEW YORK CENTRAL & HUDSON RIVER.—Stockholders by an almost unanimous vote on July 20 approved the consolidation of the New York Central & Hudson River and the Lake Shore & Michigan Southern, and it now remains for the court to pass upon protest of certain minority stockholders of the Lake Shore & Michigan Southern and for some of the state commissions that have jurisdiction to give their approval. The majority of the state commissions have already approved the plan.

NEW YORK, NEW HAVEN & HARTFORD.—In addition to the suit which the Attorney General is to bring under the Sherman Anti-Trust Law, a suit by Sherman Whipple on behalf of the estate of Ole Bull and all stockholders of the corporations who may desire to join therein has been brought. The appointment of a receiver to prosecute claims for \$306,000,000 alleged to be due under the Sherman law is sought. See also editorial and abstract of New Haven's reply to President Wilson.

OKLAHOMA CENTRAL.—See Atchison, Topeka & Santa Fe.

TOLEDO, ST. LOUIS & WESTERN.—It is reported that on August 1 the interest on the \$11,527,000 collateral, 4 per cent. bonds which are secured by the deposit of Chicago & Alton stock will be defaulted.

UNION PACIFIC.—The extra dividend, consisting of \$12 par value Baltimore & Ohio common, \$22.50 par value Baltimore & Ohio preferred, and \$3 in cash, the total of which had a market value of \$30.50, was distributed to stockholders on July 20.

PROGRESS OF RAILWAY CONSTRUCTION IN ARGENTINA.—According to data published by the Argentine ministry of public works relative to progress of different government railway lines under construction, the number of miles of track laid up to the latter part of April, 1914, was as follows: On the line from San Antonio to Nahuel Huapi, 251 miles; Comodoro Rivadavia to Colonia Sarmiento, 122 miles; Puerto Deseado to Lago, Buenos Aires, 170 miles; Formosa to Embarcacion, 153 miles; Barranqueras al Oeste, 127 miles; Barranqueras to Quimili, 55 miles; Diamante to Crespo, 22 miles; Hasenkamp al Norte, 61 miles; Nare to San Javier, 43 miles.